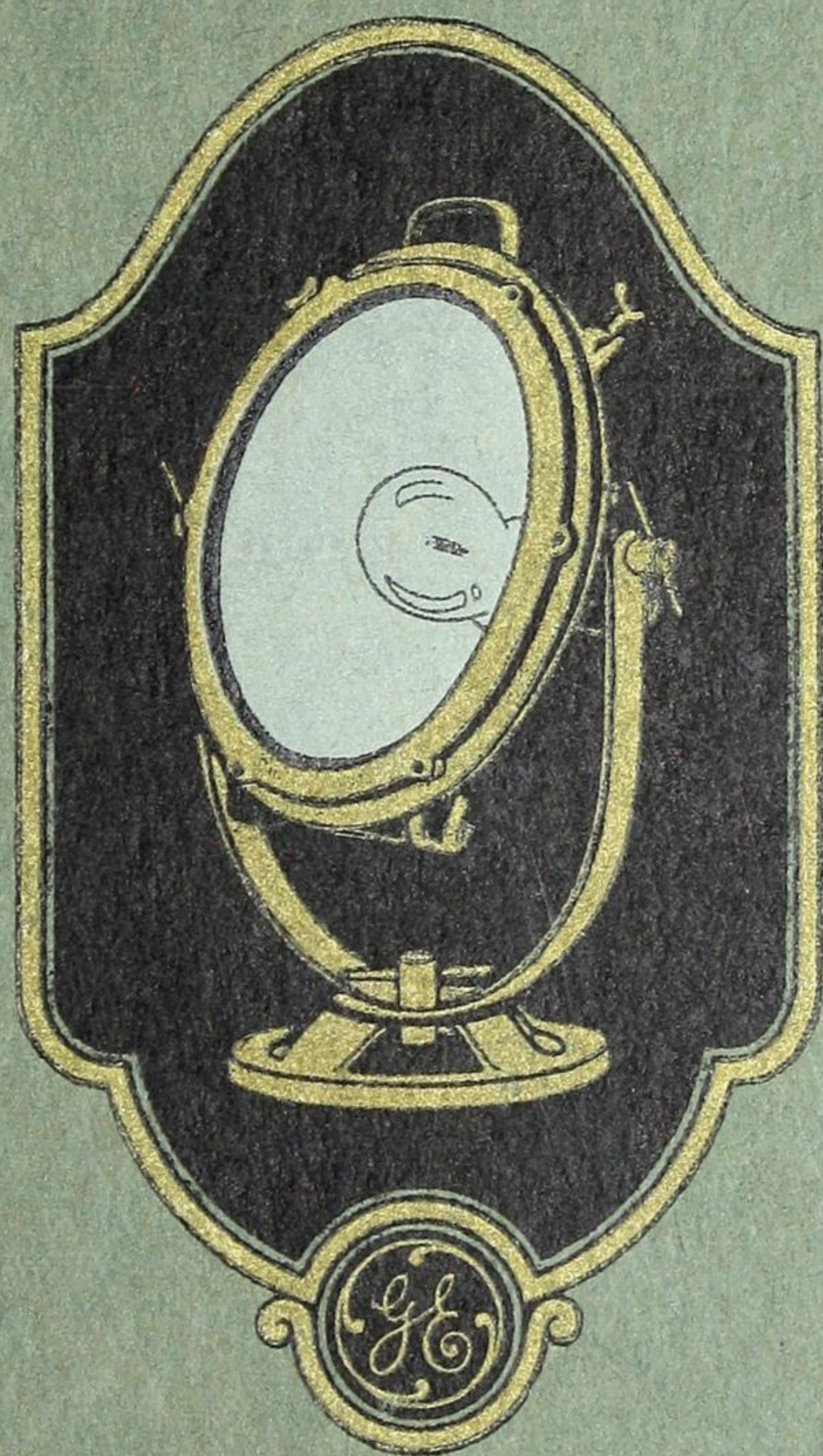


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FLOODLIGHTING



GENERAL ELECTRIC

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Floodlighting

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FLOODLIGHTING



GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y.

September, 1926

Bulletin GEA-161



ELECTRIC FOUNTAIN, DALLAS, TEXAS, ILLUMINATED IN COLOR BY G-E FLOODLIGHTING PROJECTORS

Introduction

THE modern practice of electric illumination has established new standards of utility and lofty ideals of beauty. Artificial light has become not only a potent and necessary tool of industry and commerce, but, as well, an efficient auxiliary of decorative and architectural art. The illuminating engineer, supplementing the rigid exactitude of science with a sympathetic appreciation of form and color, is exercising a profound influence on almost every activity of life—from the ordinary routine of its work to many of its finest delights.

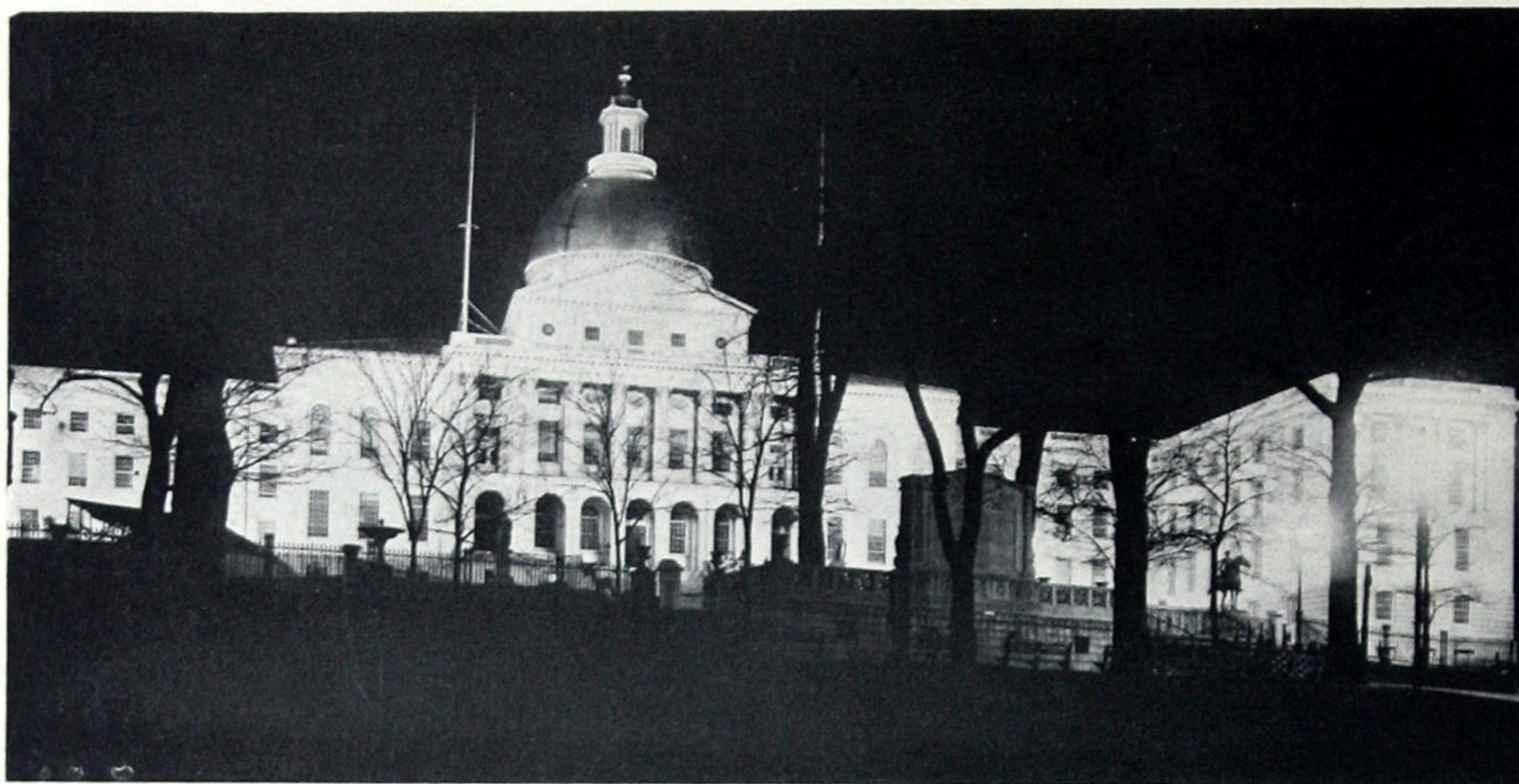
These aspects of present-day illumination find vivid and distinguished expression in the art of floodlighting. Its field of service extends from the freight yard and wharf to the splendid creations of the architect's genius. It expedites, by night, the work of the builder and protects the completed structure from marauders who depend on the cover of darkness. From an unseen source, it silvers the temples of government, of finance, and of commerce, searching out every beauty of line and decoration, suspending them, as it were, in exquisite relief against the dark sky, and giving new emphasis to the material fabrics and to the public functions which they symbolize.

Under its beams, monuments to great men and to great causes convey their message at night as well as by day; the spectacular aspects of nature—massed foliage or mighty waterfall—preserve their charm during the hours when men are free to enjoy them; and, with more intimate touch, community playgrounds are made available, when the day's work is done, for the common recreation and the health that comes with open-air play. Floodlighting has also made possible the effective illumination of outdoor pageants, carnivals, and other spectacles, and has thus given new encouragement to a colorful art that is yearly growing in public appreciation.

Perhaps the most conspicuous triumphs of floodlighting during the last fifteen years have been at national and international expositions. Men and women, by hundreds of thousands, have carried away as their most vivid impression the glory of color that transfigured pallid buildings and sculpture, and summoned into nightly bloom a vast flower of many-hued flame. It is difficult to realize that the art which thus adorned the Panama-Pacific Exposition and which adds a flood of color to the flow of Niagara Falls is the same that safeguards the making up of a freight train or facilitates the unloading of a barge. It is only by contrasting these extremes that one can appreciate the immense scope of floodlighting in its many commercial and artistic aspects—that one can understand its important place as a constructive aid to the advance of industry and culture.

The General Electric Company has erected specially equipped laboratories in which lighting specialists, engineers and artists, devote their skill and experience to new accomplishments in the technique of floodlighting—to new applications and new effects. A few of these results are pictured and described on the following pages, and a brief review is offered of the principal types of projector in which profound research has embodied a brilliantly creative service.

Buildings and Monuments



STATE HOUSE AT BOSTON, MASSACHUSETTS, AS VIEWED NIGHTLY FROM
HISTORIC BOSTON COMMON

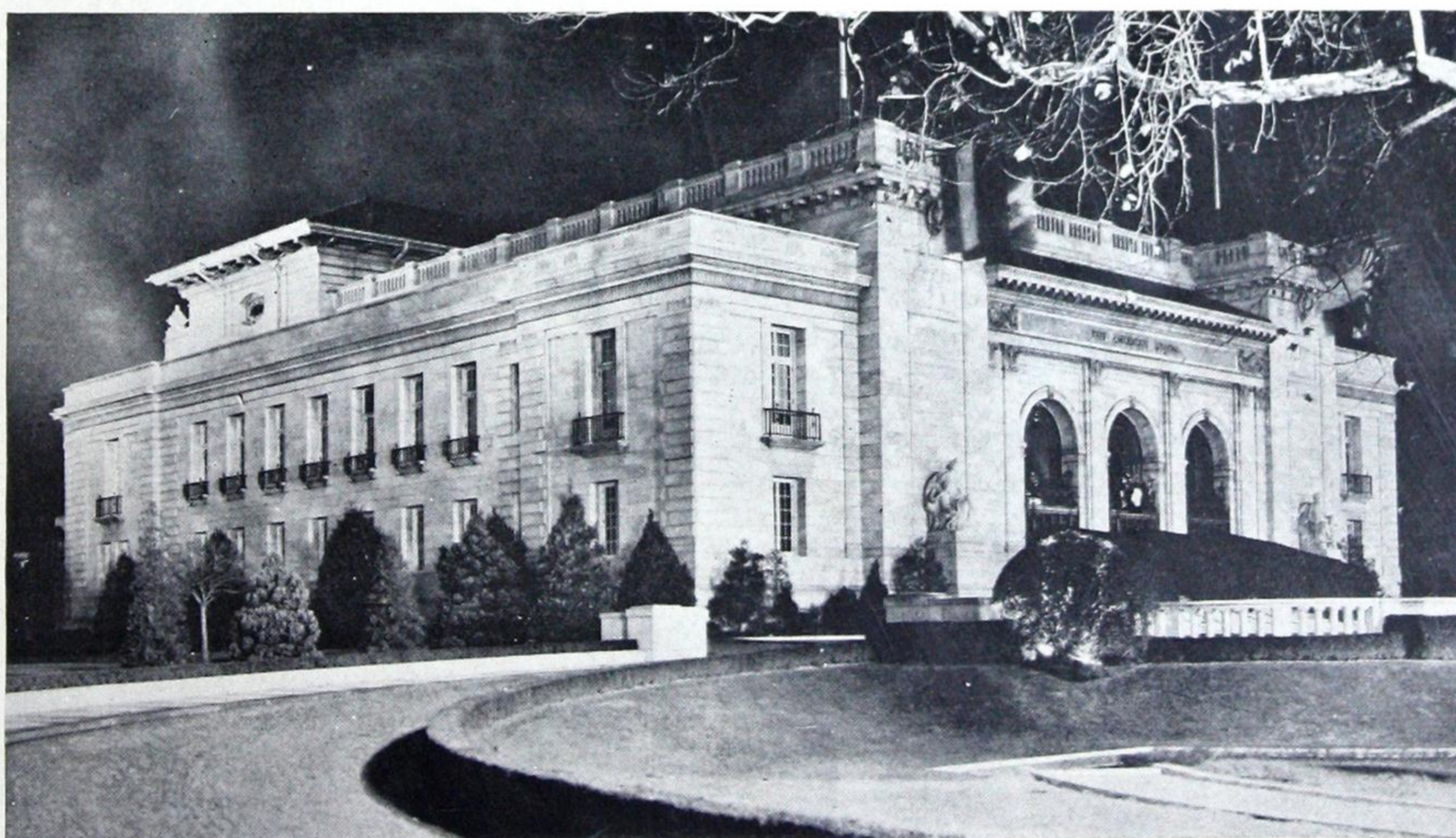
THE true architect is also a true artist. He must clothe utility with charm—design the great business structure or public building with a purity of line and fitness of ornament that shall idealize its purpose, and at the same time, express his own personality. However, until late years, the architect's finest creations were veiled in partial or total obscurity during the hours when most men find their only leisure to study them and learn new lessons of beauty. Then came the illuminating engineer with his technical knowledge, his artistic perception, and his specialized apparatus. These he enlisted in the architect's service. He erected batteries of floodlights, and towering domes flashed into view—bright sentinels of the night. In brilliant isolation, bank buildings and the homes of public utilities revealed their dignity of design to even better advantage than amid the many distractions of the day. It was not enough to flood these structures with light; care must be taken to preserve the depth and shadows of the picture—values even more important than unbroken surface. To this end, careful adjustments were devised both in the projectors and in their position and angle. The result was a lustrous revealing of the architect's thought, compelling the beholder's concentrated interest by very force of contrast with the close darkness.

This intensive illumination of civic structures has a value that cannot be computed in terms of finance. Its educational worth in fostering an appreciation of architectural merit—its enhancement of municipal distinction—the quiet persistence with which it emphasizes important elements in the city's business and political prestige—all these contributions, and many others, mark a distinction of service and entitle floodlighting to a recognized place among the fine arts.

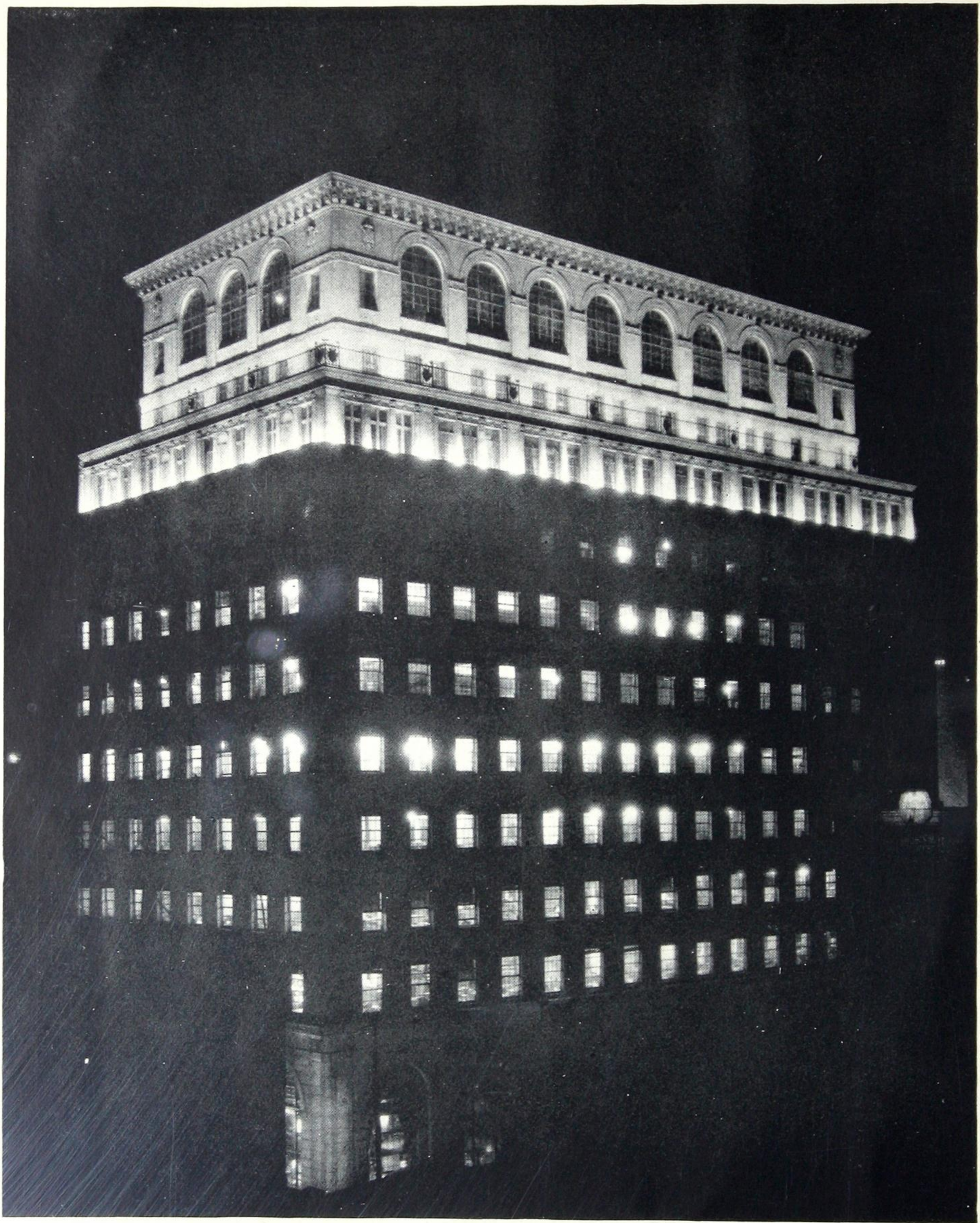
The statue of a famous man, the sculptured memorial of an important event, the shrine of a national hero—all are erected as *continuing* reminders of great lives and worthy acts—as ever visible promptings to reverence or sources of inspiration. If this continuity of appeal is to be preserved, if the skill of the designer and the vision of the artist are to exercise their power whenever there are eyes to see, it is necessary that the memorial be as conspicuous through the hours of darkness as under the sun's rays. Floodlighting exercises a privileged office in being the only universally effective method by which this result can be obtained. Not only statues, but historic buildings and decorative fountains can thus be illuminated; and the glory of stained-glass windows, lighted from within, can be cast across the night.



SOLDIERS' AND SAILORS' MONUMENT
RIVERSIDE DRIVE, NEW YORK CITY



PAN-AMERICAN BUILDING AT WASHINGTON, DISTRICT OF COLUMBIA
Paul Cret, ARCHITECT



THE BROOKLYN EDISON COMPANY BUILDING, BROOKLYN, NEW YORK
McKenzie, Voorhees and Gmelin, Architects

American industry, too, in its comprehensive and beneficent program, has during recent decades erected thousands of monumental structures that not only serve its practical purposes but typify the importance of its place in our economic life. These buildings, in all their substantial dignity, deserve - and in many instances have received - the distinction of adequate floodlighting during the evening hours. Quite apart from its publicity value, which is considered on another page, such illumination calls admiring attention to these evidences of industrial expansion and to the corporate enterprise which prompted their erection.

With the war-time value of floodlighting in mind, proprietors of industrial plants and officials responsible for the safety of public works and buildings are applying the same safeguard as a protection against enemies of society. At every large factory and warehouse there are approaches, yards, stretches of wall and of roof that need vigilant patrol, especially at night. However, human eyes cannot command every point at all times unless the whole is uniformly and effectively lighted. G-E Floodlighting Projectors perform this function at every point of access. They can be so placed as to give special intensity to structures that, for any reason, are most liable to unlawful attempts. They enable a few watchmen to cover a large area, and their very presence is a well-heeded warning to the evilly disposed to stay at a safe distance.

Docks, grain elevators, and ship yards are a tempting field for marauders. In such places—and wherever else there is a store of valuable material or finished products—a few floodlights at strategic points are a more certain protection than bolts and chains—more to be depended on than a multiplication of watchmen.

In addition to such public structures as prisons, arsenals, water works, and reservoirs there are great numbers of privately owned ship yards, chemical plants, power stations, stock yards, gas tanks, wharfs and the like, that must be under constant guard and that can be made immeasurably more secure by an appropriate installation of G-E Floodlights.



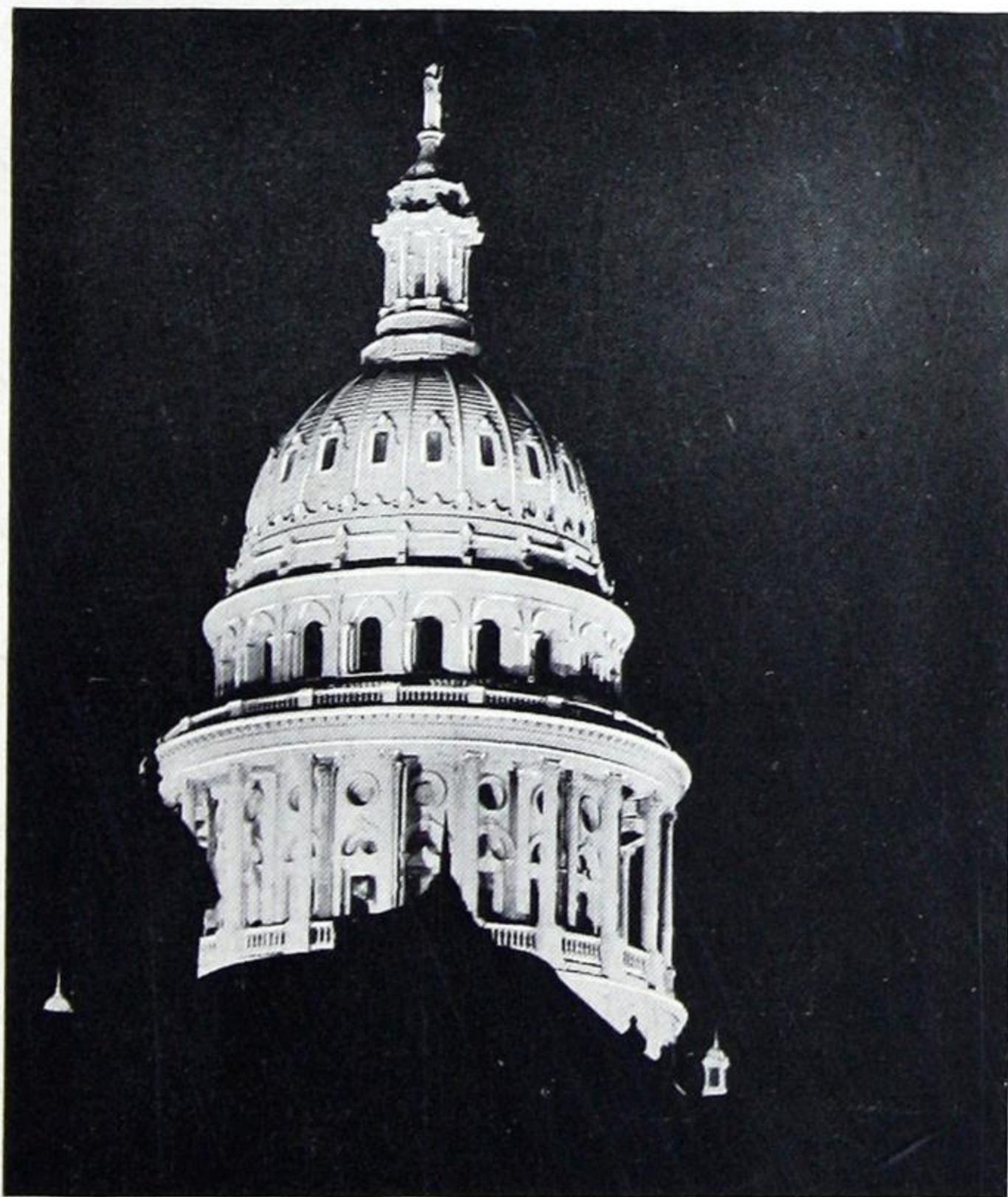
UNITED STATES PLAYING CARD COMPANY, CINCINNATI, OHIO



THE BOOK TOWER, DETROIT, MICHIGAN
Lewis Kemper, Architect



DOME OF THE CAPITOL BUILDING AT WASHINGTON, DISTRICT OF COLUMBIA



STATE HOUSE DOME, AUSTIN, TEXAS



STATE HOUSE DOME, TOPEKA, KANSAS



AMERICAN AND BRIDAL VEIL FALLS, NIAGARA, NEW YORK. ILLUMINATED BY G-E MEDIUM INTENSITY ARC PROJECTORS

Lighting Nature's Beauties

FACILITY of transportation and, especially, the vogue of the automobile are leading a whole people to a new appreciation of nature's beauty and to a delighted interest in the spectacular aspects of rock and river and in the pleasure parks that have blossomed under the art of the landscape gardener. The extension of improved roads and the increasing adoption of correct highway lighting have opened the night hours to leisurely sight-seeing travel—frequently in preference to daytime driving.

As a result of this national seeking for scenic enjoyment, plans are being elaborated in many sections of the country to make local points of natural charm attractive to the tourist by night as well as during the day. For spectacular accomplishment of this object, no agent is so effective—none so artistically satisfying—as well-planned floodlighting.

The permanent illumination of Niagara Falls is a conspicuous example of the results secured by floodlighting engineers of the General Electric Company—not only as a contribution to the majestic appearance of the Falls at night, but as a practical enhancement of the fame which makes them a Mecca for travelers and tourists. Night after night, the seventy-five thousand spectators who were present at the opening celebration are succeeded by other thousands, attracted from the ends of the earth to witness the

white floodlighting that turns Niagara into a vivid liquid curtain hung across the dark—or, on special occasions, to watch the richness of color with which art has given a new and glorious aspect to this crown-jewel among American waters.

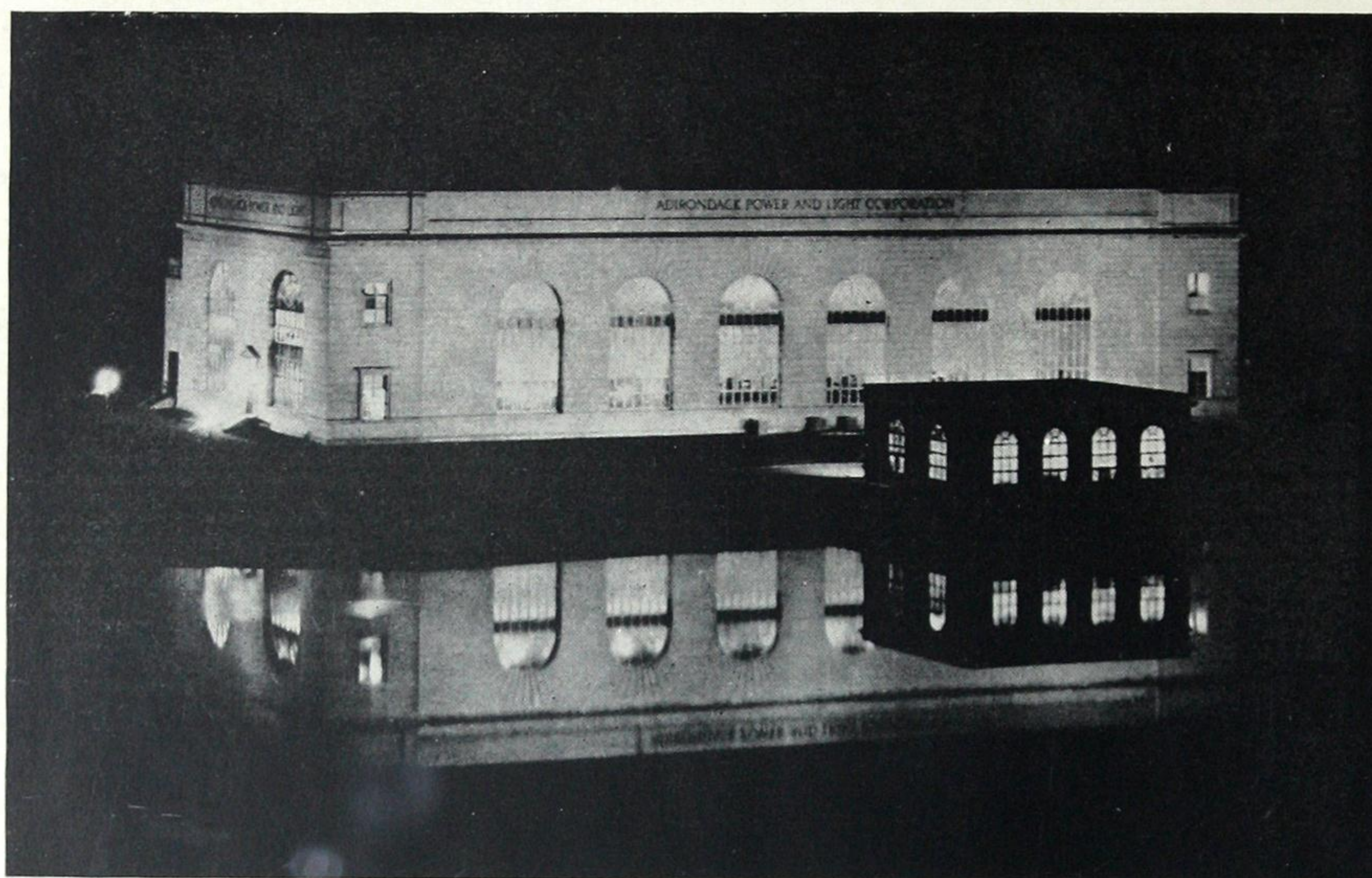
Every large city counts among its assets some extensive park dedicated to public recreation. Here the hand of man has used the gifts of nature to create pleasure grounds rich in beauties of landscape, foliage, and sparkling waters. Here, too, the art of floodlighting has been enlisted to emphasize many of these beauties through the evening hours. It has, especially, attracted admiration in many communities through the finely colored illumination of public fountains, as illustrated by the frontispiece of this book.*



ILLUMINATED FOLIAGE, ASSOCIATION ISLAND,
HENDERSON HARBOR, NEW YORK

*"The Electric Fountain," Bulletin GEA-300A, will be mailed upon application to General Office, Schenectady, N. Y.

Advertising



ADIRONDACK POWER AND LIGHT CORP. STATION, AMSTERDAM, NEW YORK
McKim, Mead and White, Architects

I N its broader sense, advertising—or publicity—includes every agency that can create a favorable public impression of the advertiser and his product, whether the latter be electric energy, food, furniture, or financial accommodation. The dignified structure of a great business enterprise is a continual and generally convincing assertion of stability and worth. From dawn to eve it compels the attention of all who use street or highway—and, in many situations, of daily thousands of railway passengers. Only when darkness has obscured its lines and lettering does it cease to speak.

Floodlighting completes the interrupted message. From an unseen point of vantage it throws into brilliant relief the business building or factory. From roof to ground the walls fairly glow—become more prominent than in the diffused light of day. Lettered signs and carved names meet the eye in finest detail. Instead of being one among many architectural advertisements, the structure commands undivided vision and interest.

Floodlighting is equally applicable to the suburban factory and to the commercial house in the heart of a city. In the one case, it is brightly visible to a host of travelers by rail and highway; in the other, its publicity is ever before the eyes of citizens and visitors. Whether the building house a theater or a bank, show rooms or a department store, this powerful but dignified form of advertising gives distinction, contributes to the development of business, and builds good will.

The commercial advantages of floodlighting are not confined to large buildings. The wayside service station, the public garage, and retail business that can profit by transient patronage will attract custom through the white light of publicity projected upon their walls and signs by a simple and comparatively inexpensive floodlight installation. Advertising banners and commercial posters attract interested attention when thus set off against the dark.

It is a recognized principle of billboard advertising that the message must be so brief as to be read easily in three or four seconds. The thousands of motorists whose cars speed by these advertisements at night will not even see the poster unless it be so brilliantly lighted as to force picture and phrase on their attention. The floodlighted billboard signals its presence in advance and can be read at a glance as the car flashes by.

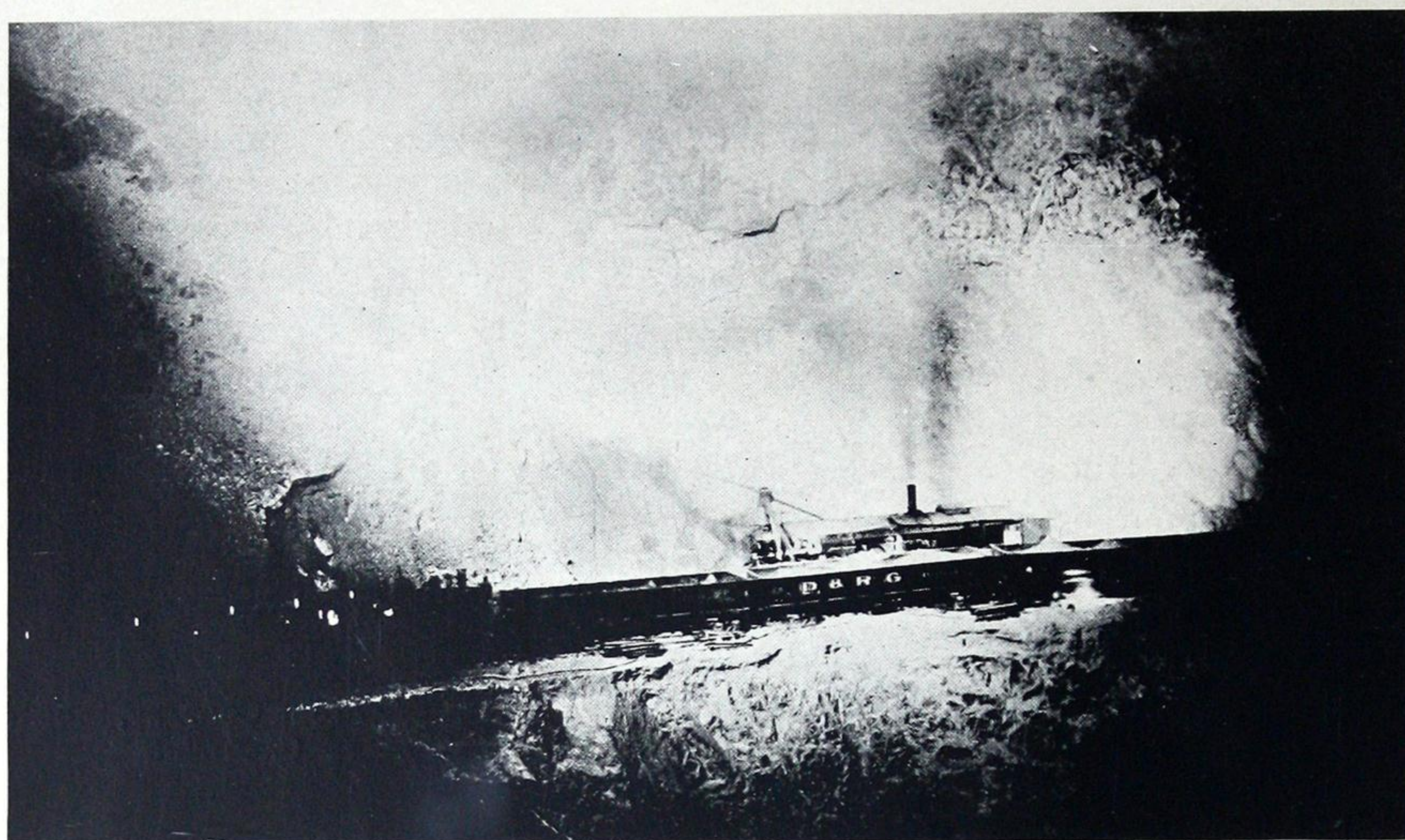


SPERRY FLOUR COMPANY, STOCKTON,
CALIFORNIA



CITIZEN'S TRUST COMPANY, UTICA, NEW YORK

Facilitating Night Work



STEAM SHOVEL WORKINGS, UTAH COPPER COMPANY, BINGHAM, UTAH

THE hours of daylight do not always suffice for modern building operations. Many other industries also require night work, either to take advantage of a short season or because of the heavy demand for their products. The deep foundations of a great office building must be laid in as short a time as possible, and there is the same urge in completing the superstructure. Only as the entire working field is evenly and generously illuminated, can this exacting—and often dangerous—labor be continued at night with precision and in comparative safety. Electric floodlighting is the only comprehensive and completely effective method of attaining this result whether the work be the construction of “skyscraper”, bridge, or ocean liner. In like manner, it facilitates ice harvesting and lumbering—seasonal industries that usually must be carried on under severe pressure. It enables the quarry man and the surface miner to increase their output by as many hours as night can add to day. The emergencies of waterway transportation—the loading and unloading of barges and freighters—can be met with speed, safety, and profit where the work is guided and guarded by the powerful white rays of floodlighting projectors. In all these operations, as in many other branches of industry, effective speed is often of more importance than cost; however, the installation and maintenance of floodlights is so inexpensive in comparison with their accomplishment that a substantial economy results. Light also makes for safety. Floodlighting eliminates many of the distressing accidents that not only destroy life but often take a serious financial toll.

Railroad Yard Lighting

RAILROAD yard routine, with its high responsibility and ever present dangers, demands night illumination that approximates daylight value if complicated operations are to be performed smoothly and fatalities avoided. Switching must be swift and sure, freight trains must be made up without mistake; damage must be minimized; thefts must be prevented; loading and unloading must be facilitated at all hours. Floodlighting makes possible an economical and safe 24-hour schedule, whereas defective or "spotty" illumination slows up work, invites error and accident, and encourages petty crime.

A report covering operations in a large railroad classification yard, compiled by the Committee on Illumination of the Association of Railway Electrical Engineers, is in point. It is based on data covering several months and compares a period during which electric floodlights were used, with a like, preceding period when there was no artificial illumination. It was found that the number of cars handled at night had increased 15.5 per cent; that the average cost of damage per car handled at night decreased 21 per cent; that the number of personal injuries occurring at night in the period before illumination was twelve, compared with none that could be attributed to lack of illumination following the installation; and that the lighting system had convincingly demonstrated its value as an aid to police work in the yard.

This report presents a fair illustration of the economy and protection that are afforded by a comprehensive floodlighting of railroad yards.



SELKIRK YARDS OF THE NEW YORK CENTRAL RAILROAD



AERIAL FIREWORKS ILLUMINATED BY G-E INCANDESCENT PROJECTORS
GREAT WESTERN GATEWAY EXPOSITION, SCHENECTADY, NEW YORK

Expositions and Carnivals

ELECTRIC floodlighting commands all the colors of the spectrum. Men and women of every nation marveled at the flaming effects—the play of contrasted colors—with which engineers of the General Electric Company glorified the Panama-Pacific Exposition. The white electric light, projected through richly tinted screens, wrought a nightly enchantment that became world-famous. It also helped to establish new standards of decorative outdoor illumination and an increased vogue for outdoor pageants and similar performances of a theatrical nature. Such spectacles, especially historical commemorations, generally require a large area for adequate interpretation and must, of course, be lighted with breadth and brilliancy. The massed effects demand massed illumination such as can be obtained only by a well-considered system of floodlighting. In fact, the author of a modern masque or other outdoor dramatic presentation plans his whole *mise en scène* with a view to the splendor with which floodlights will invest it.

Commercial and industrial expositions have proved to be of marked value in the promotion of business. As these “shows” are usually held in very large halls, sometimes out of doors, the problem of lighting presented serious difficulties until illuminating engineers demonstrated the complete efficacy of floodlighting not only as a general illuminant but in enhancing the effect of individual exhibits.

From time to time, every community has occasion to celebrate some event of local importance—an “old home week” or the formal dedication of a public structure. For weeks the event is heralded by placard and banner. It is sought to acquaint every visitor with the coming festivity. Floodlighting emphasizes the message of sign, poster, and banner and is a brilliant and generally necessary feature of the celebration itself.



AN OUTDOOR PAGEANT AT NEWARK, NEW JERSEY



AERIAL FIREWORKS ILLUMINATED BY G-E INCANDESCENT PROJECTORS
GREAT WESTERN GATEWAY EXPOSITION, SCHENECTADY, NEW YORK

Expositions and Carnivals

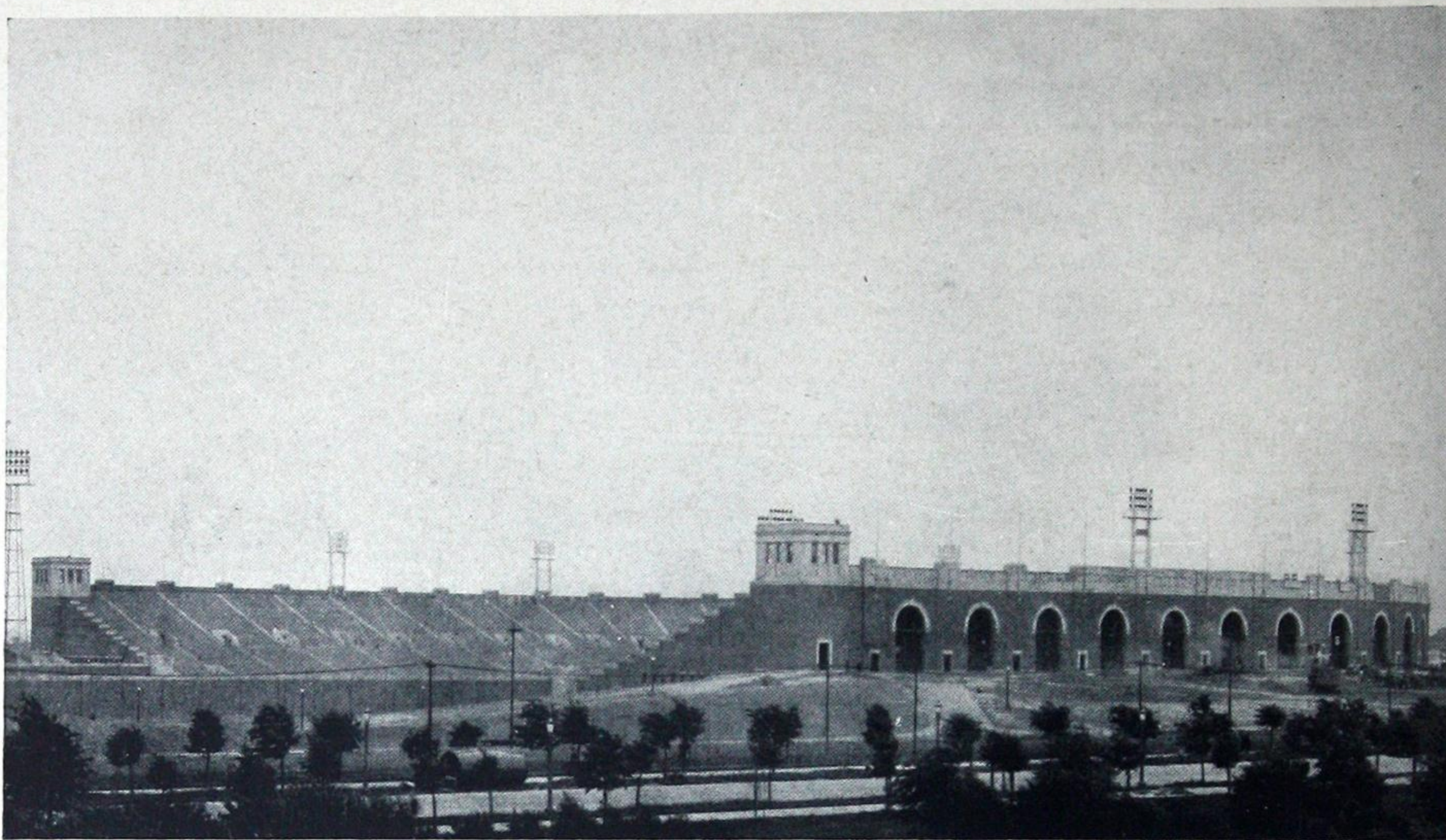
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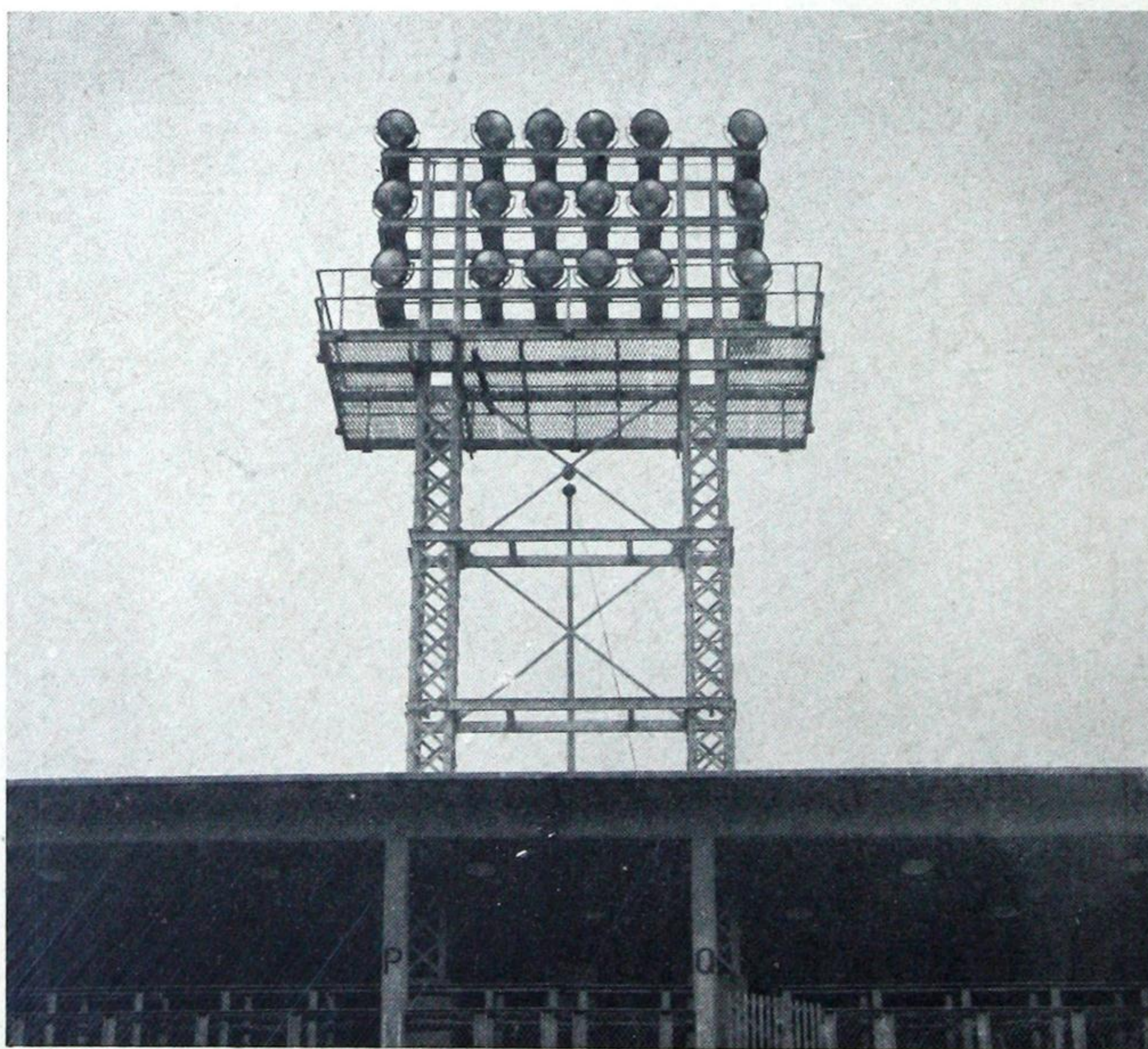
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AN OUTDOOR PAGEANT AT NEWARK, NEW JERSEY



MUNICIPAL STADIUM, SESQUI-CENTENNIAL EXPOSITION, PHILADELPHIA, PENNSYLVANIA, SHOWING
ARRANGEMENT OF FLOODLIGHTING TOWERS



MUNICIPAL STADIUM FLOODLIGHTING TOWER ILLUSTRATING METHOD
OF PROJECTOR MOUNTING

Sports

MOST men and many women are compelled to confine their recreation to "after-business" hours; they cannot otherwise join in the amusements and exercise afforded by public athletic grounds and private clubs. Recent applications of floodlighting have added to the hours in which these pastimes can be enjoyed freely and safely. Among conspicuous examples of successful winter-night illumination may be mentioned installations for outdoor skating and curling, hockey, tobogganning, and ice carnivals in general. Devotees of these sports have been quick to take advantage of the floodlit night. They appreciate the large measure of safety, the glowing beauty with which the scene is graced, and, above all, the opportunity for vigorous, healthful exercise and merry participation in the carnival spirit that is awakened under the brilliant electric beams.

At the other extreme of the seasonal scale is the floodlighting of bathing beaches. The hot-weather swim and water-play, which make seaside and lake shore vacations so attractive, can now be enjoyed far into the night with the same freedom and the same safety as by day. Floodlighting projectors embrace beach and water with their long arm of light, and a new thrill is added to the holiday—a new asset helps increase the profits of these summer resorts and of winter playgrounds in the South.

A simple floodlighting equipment extends the shortening autumn days for the benefit of football practice, tennis play, and other athletic sports. Field and track are so sharply defined that players and spectators alike can follow every move as accurately as in the daytime. Floodlighting is also used with excellent results on trap-shooting fields and in rifle galleries, and many a ballroom and dance hall has gained new charm through the vari-colored rays projected by this brilliant exponent of the electrical art.



A FOOTBALL GAME AT NIGHT. G-E ATHLETIC FIELD, WEST LYNN, MASSACHUSETTS

G-E Floodlighting Projectors

THE following pages illustrate the standard types of G-E Floodlighting Projectors together with the three styles of bases—hinged, swivel-and-trunnion, and pipe-stand. Forms L-1 and L-3 can be supplied with any one of these bases. Forms L-9, L-11, and L-15 are not built with hinged bases.

Standard Types

Briefly, the equipment and use of each type are as follows:

Form L-1, for long-range illumination, 100 to 500 feet. The 500-watt floodlighting lamp is used.

Form L-3, for short-range illumination, 10 to 75 feet. The 500-watt floodlighting lamp is used.

Form L-9, for long-range illumination, 100 to 500 feet. The 500-watt floodlighting lamp is used. This unit is similar to the Form L-1 except that the reflector is of glass.

Form L-11, for short-range illumination, 10 to 75 feet. The 250-watt floodlighting lamp is used.

Form L-15, a universal type, utilizing any standard 110- or 220-volt, 300- to 1000-watt lamp, or the 500-watt floodlighting lamp.

Form L-20, for medium and low intensities at distances up to 75 to 85 feet. The standard 100-, 150-, or 250-watt lamp can be used.

Forms L-22 and L-24, for railroad yard and large-area lighting. The standard 110- or 220-volt, 300- to 1000-watt lamp can be used.

Features and Accessories

G-E Floodlighting Projectors are weatherproof, compact, and accessible.

The reflectors are carefully designed to give the most efficient light projection. Each unit is equipped with a simple focusing mechanism which can be adjusted to locate the lamp filament at the focal point of the reflector. The relative position of filament and reflector is an important factor in the operation of the projector.

The Form L-1 has a polished aluminum reflector, while those of the remaining forms are of glass. The silver plating on the outer surface of the glass reflectors is hermetically sealed by a thick coating of electrolytic copper. This construction adds considerable strength to the glass, assists in the radiation of heat, and obviates the necessity for an additional outer casing.

The projected light beam is cone-shaped. When it is perpendicular to a flat surface, a circular area is illuminated. At any other angle, an elliptical area is illuminated.

The front door of the projector is mounted on hinges, and can be opened by loosening two wing nuts. The direction of the projected light beam is fixed by hand clamps.

Unless otherwise specified by the customer, a convex lens of plain glass will be furnished in all units except the L-15 which has a stippled glass door. The stippled glass lens is recommended for installations where the glare of the unit is objectionable. Plain or stippled lenses can also be supplied in the following colors: red, amber, green, or blue.

Form L-I Projector



FORM L-I—HINGED BASE
CAT. No. 166012



FORM L-I—SWIVEL AND TRUNNION
CAT. No. 189962



FORM L-I—PIPE STAND
CAT. No. 195852

The Form L-I Projector is composed of a 16-inch, highly polished aluminum reflector, mounted in a cast-iron casing. A convex pane of special, heat-resisting glass is accurately fitted to the cast-iron door frame, which can be opened for relamping.

These projectors are designed to illuminate surfaces at a distance of 150 feet or more, and have a beam divergence of approximately 10 to 16 degrees. As shown in the above photograph, they can be equipped with a hinged base, a swivel-and-trunnion base, or a swivel-and-pipe stand support. Although these units are fitted with a Mogul screw socket for the 500-watt MAZDA floodlighting lamp, an adapter which permits the use of a 250-watt MAZDA floodlighting lamp can be furnished without additional charge.

Form L-3 Projector



FORM L-3—HINGED BASE
CAT. No. 189668



FORM L-3—SWIVEL AND TRUNNION
CAT. No. 195865

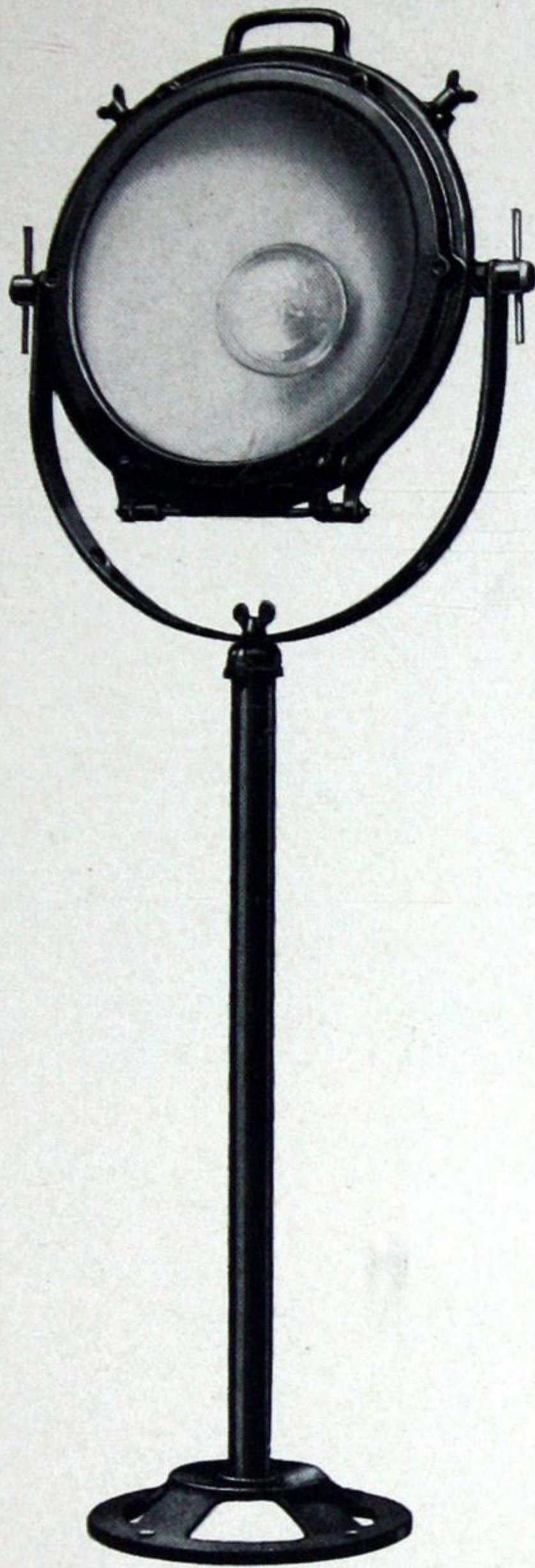


FORM L-3—PIPE STAND
CAT. No. 195866

The Form L-3 Projector has a special glass reflector, which consists of a number of sectional mirrored glasses, set at angles with each other and arranged in three zones. They are held in place against a sheet steel casing by means of metal strips. This arrangement produces a wide-angle beam of well-diffused light and is particularly adapted for illuminating an object at close range. A beam divergence of about 50 degrees greatly decreases the light intensity and permits its use at distances up to 75 feet.

The best results are obtained by using the 500-watt MAZDA floodlighting lamp; however, the 250-watt MAZDA floodlighting lamp can be substituted by equipping the Mogul screw socket with an adapter. This projector can be furnished with a hinged base, a swivel-and-trunnion base, or a swivel-and-pipe-stand mounting.

Forms L-9 and L-II Projectors



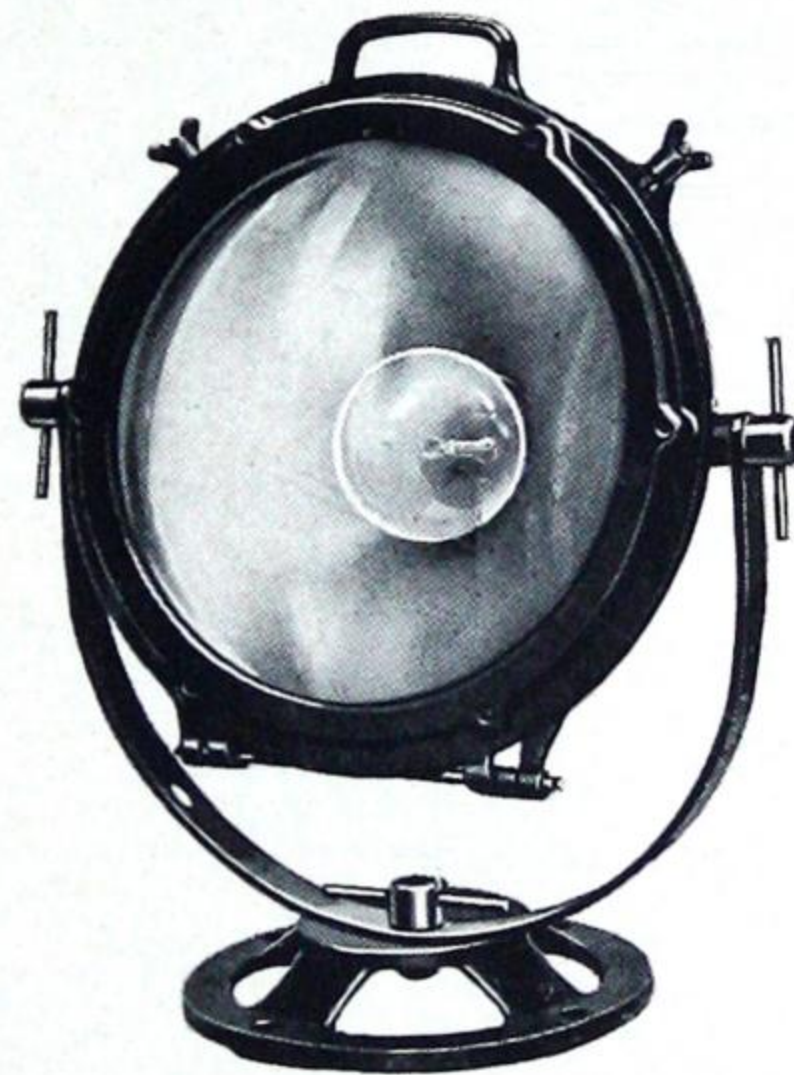
FORM L-9—PIPE STAND
CAT. No. 195864



FORM L-II—SWIVEL AND TRUNNION
CAT. No. 197450



FORM L-II—PIPE STAND
CAT. No. 195876



FORM L-9—SWIVEL AND TRUNNION
CAT. No. 195863

Forms L-9 and L-II Projectors are of similar construction. Each is equipped with a parabolic glass reflector, the outer or silvered surface of which is hermetically sealed by a thick copper coating.

The Form L-9 has a 16-inch reflector and is designed for the illumination of small areas at a distance of from 100 to 400 feet. The beam divergence is approximately 12 degrees. Either the 500-watt floodlighting lamp or the 250-watt floodlighting lamp can be used, the latter requiring an adapter for the Mogul screw socket.

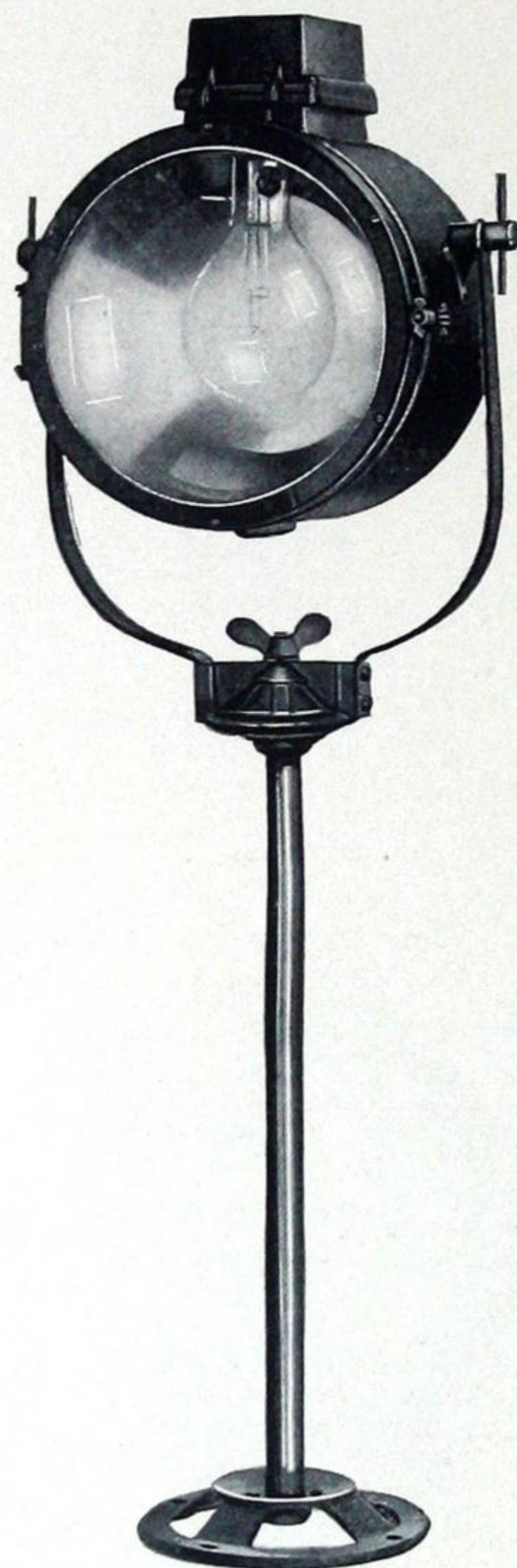
The Form L-II has a 10 $\frac{1}{4}$ -inch reflector and accommodates only the 250-watt floodlighting lamp. It fills the demand for a small unit having a medium angle beam, and must be mounted close to the illuminated object.

Swivel-and-trunnion or pipe-stand bases can be furnished.

Forms L-15 and L-20 Projectors



FORM L-15, SWIVEL AND TRUNNION
CAT. NO. 218408



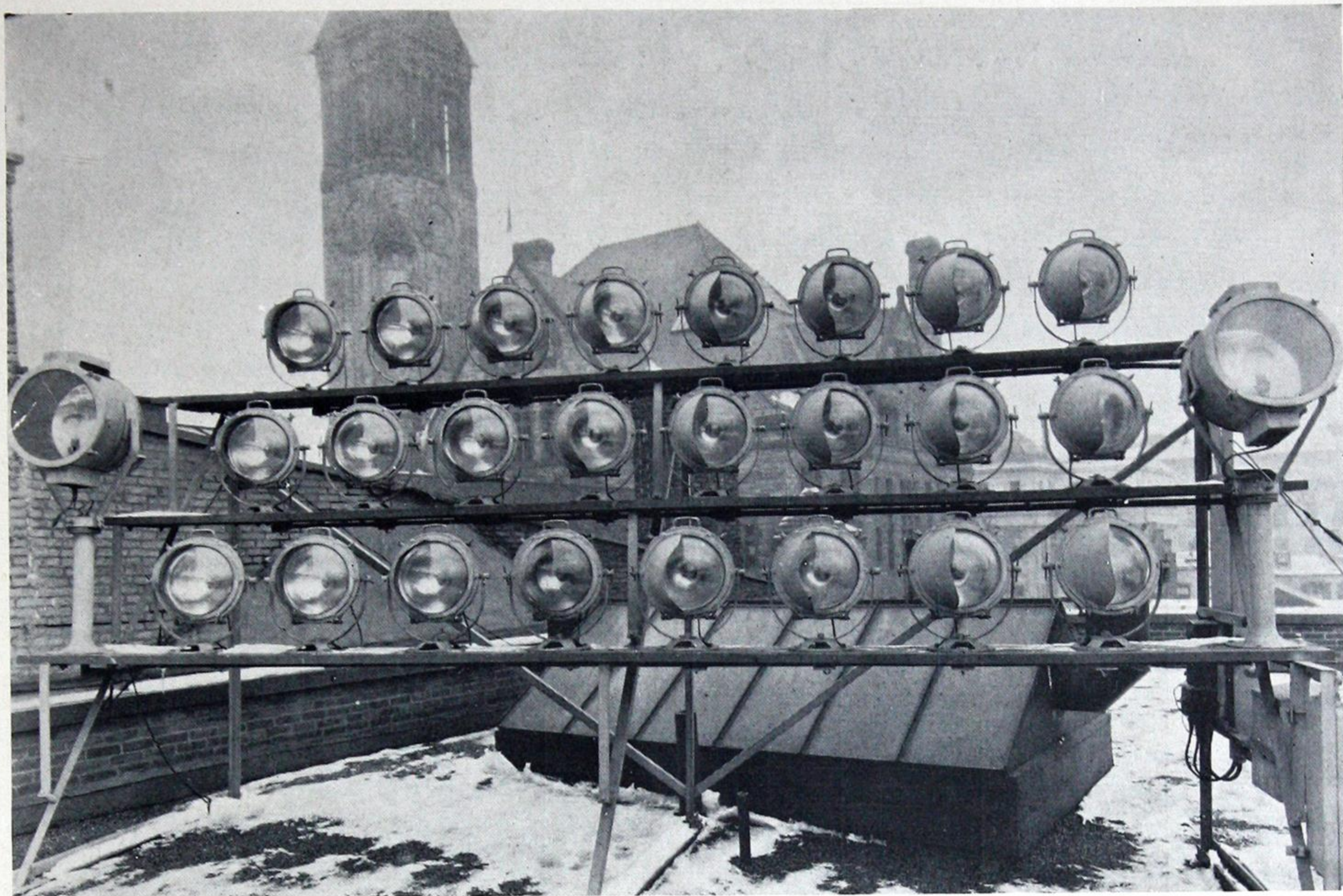
FORM L-15, PIPE STAND
CAT. NO. 218409



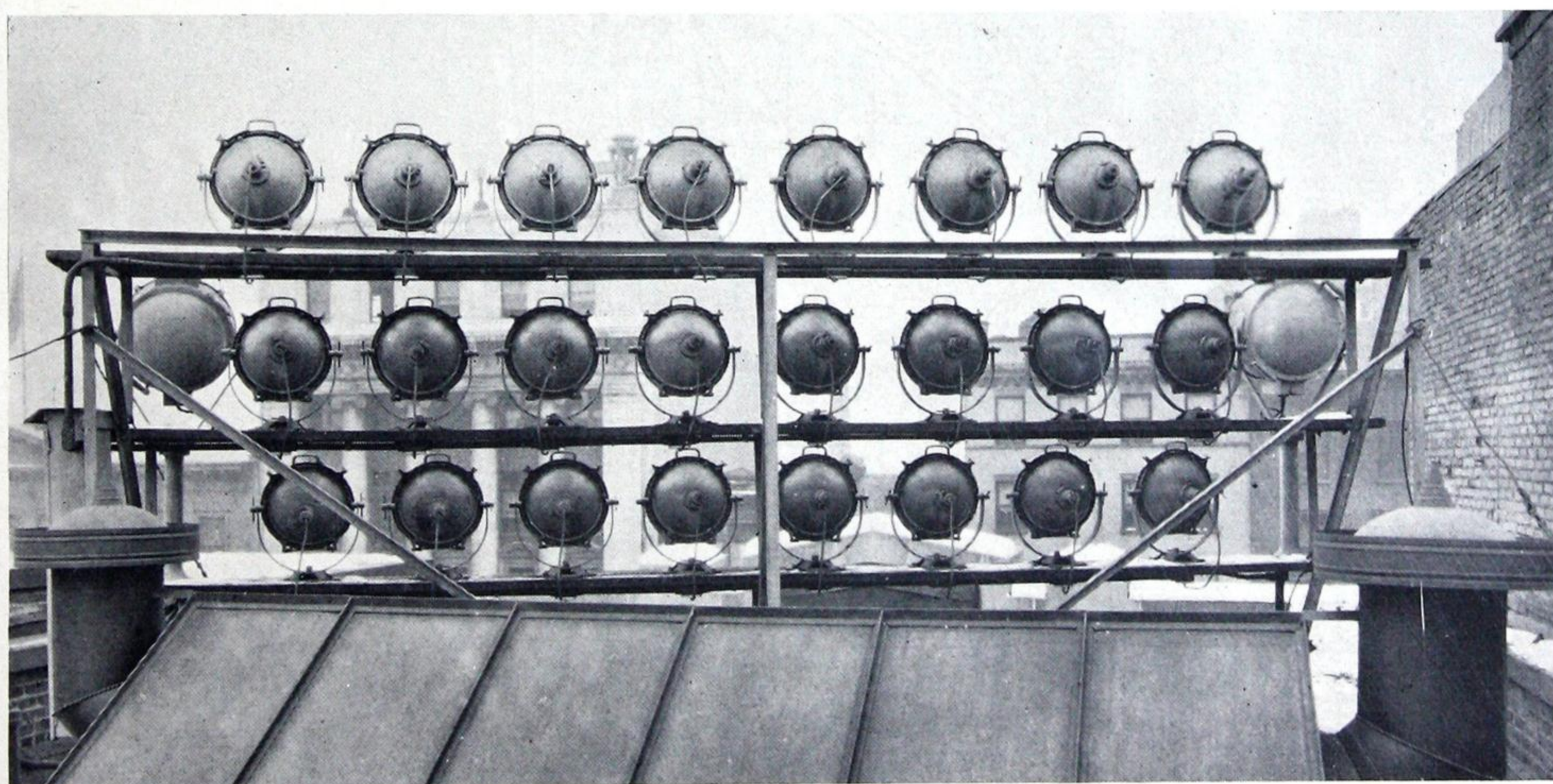
FORM L-20, HINGE AND SWIVEL
CAT. NO. 257660

The Form L-15 is a universal type of projector, adaptable to all classes of floodlighting. It has a ventilated sheet metal casing and a deep, composite-type glass reflector. The beam divergence is from 20 to 30 degrees. A special focusing mechanism permits adjustment in both the vertical and horizontal planes and is conveniently located inside the hinged ventilating cowl. Standard 110-220-volt, 300 to 1000 watt lamps can be used. This unit is available with either the swivel-and-trunnion or swivel-and-pipe-stand base.

The Form L-20 has a sheet metal casing and a 10 1/2 inch glass reflector. The beam divergence is approximately 32 degrees. This unit is suitable for medium and low intensities up to 75 or 85 feet distance, and will accommodate the standard 100-, 150- and 200-watt lamps. A greater flexibility in respect to lamp sizes is thus available with the Form L-11, which has a similar use, but accommodates only the 250-watt MAZDA floodlighting lamp. The Form L-20 has a special swivel-and-hinge base.



FRONT VIEW OF PROJECTOR MOUNTING FOR THE FLOODLIGHTING OF THE
MUNICIPAL GAS COMPANY BUILDING, AT ALBANY, N. Y.



REAR VIEW OF ABOVE INSTALLATION. TWENTY-FOUR G-E FORM L-9 PROJECTORS, AND TWO 18-INCH
INCANDESCENT SEARCHLIGHTS ARE USED. THE LATTER ARE DIRECTED ON JEWELLED
CORNICES. SEE PAGE THIRTY-FOUR

Dimensions of G-E Floodlighting Projectors

THERE are three styles of bases for General Electric Floodlighting Projectors—hinged, swivel-and-trunnion, and pipe-stand. The hinged base, as supplied with Forms L-1 and L-3, is adjustable only in the vertical plane, while the swivel-and-trunnion base, available with all units except the Form L-20, provides adjustment in both the vertical and horizontal planes. Pipe-stand bases offer a convenient method for mounting swivel-and-trunnion equipped units at elevations above cornices or other obstructions in the path of the light beam. The small overall dimensions of the Form L-20, permit the use of a special hinge-and-swivel base which has the same adjustment range as the swivel-and-trunnion.

The following table of dimensions should be used for reference only.

FORM	CAT. NO.	FIG. NO.	DIMENSIONS IN INCHES										
			OVERALL			D	E (Dia.)	F	G	H	J	K (Max.)	L
			A (Max.)	B	C								
L-1	166012	1	$14\frac{5}{16}$	18	21	$10\frac{1}{4}$	$14\frac{3}{8}$	....	....	....	....	....	....
L-1	189962	2	$16\frac{15}{16}$	22	$25\frac{5}{8}$	$14\frac{7}{8}$	$14\frac{3}{8}$	18	4	12	$2\frac{1}{8}$	$14\frac{15}{16}$	....
L-1	195852	3	$16\frac{15}{16}$	22	$58\frac{1}{4}$	$47\frac{1}{2}$	$14\frac{3}{8}$	18	4	12	$2\frac{1}{8}$	$14\frac{15}{16}$	....
L-3	189668	1	$18\frac{11}{16}$	18	21	$10\frac{1}{4}$	$14\frac{3}{8}$	....	....	....	....	....	....
L-3	195865	2	$20\frac{11}{16}$	22	$25\frac{5}{8}$	$14\frac{7}{8}$	$14\frac{3}{8}$	18	4	12	$2\frac{1}{8}$	$18\frac{11}{16}$	....
L-3	195866	3	$20\frac{11}{16}$	22	$58\frac{1}{4}$	$47\frac{1}{2}$	$14\frac{3}{8}$	18	4	12	$2\frac{1}{8}$	$18\frac{11}{16}$	....
L-9	195863	4	$15\frac{7}{8}$	22	$25\frac{5}{8}$	$14\frac{7}{8}$	$14\frac{3}{8}$	18	$4\frac{1}{8}$	12	$2\frac{1}{8}$	14	....
L-9	195864	5	$15\frac{7}{8}$	22	$58\frac{1}{4}$	$47\frac{1}{2}$	$14\frac{3}{8}$	18	$4\frac{1}{8}$	12	$2\frac{1}{8}$	14	....
L-11	197450	4	$12\frac{9}{16}$	$17\frac{1}{2}$	$20\frac{1}{2}$	12	$10\frac{3}{8}$	$13\frac{1}{2}$	$2\frac{13}{16}$	$6\frac{1}{4}$	$1\frac{1}{8}$	$12\frac{1}{4}$	....
L-11	195876	5	$15\frac{7}{16}$	$17\frac{1}{2}$	54	$45\frac{1}{2}$	$10\frac{3}{8}$	$13\frac{1}{2}$	$2\frac{13}{16}$	12	$2\frac{1}{8}$	$12\frac{1}{4}$	....
L-15	218408	6	$15\frac{1}{2}$	$21\frac{3}{8}$	$30\frac{3}{4}$	$17\frac{3}{4}$	$14\frac{3}{8}$	$16\frac{5}{8}$	$8\frac{7}{16}$	12	....	....	$21\frac{3}{8}$
L-15	218409	7	$15\frac{1}{2}$	$21\frac{3}{8}$	$62\frac{3}{4}$	$49\frac{3}{4}$	$14\frac{3}{8}$	$16\frac{5}{8}$	$8\frac{7}{16}$	12	....	....	$53\frac{1}{8}$
L-20	257660	8	$12\frac{3}{16}$	$15\frac{1}{8}$	16	$9\frac{1}{8}$	....	$13\frac{3}{4}$	$3\frac{15}{16}$	6	....	$14\frac{9}{32}$	....

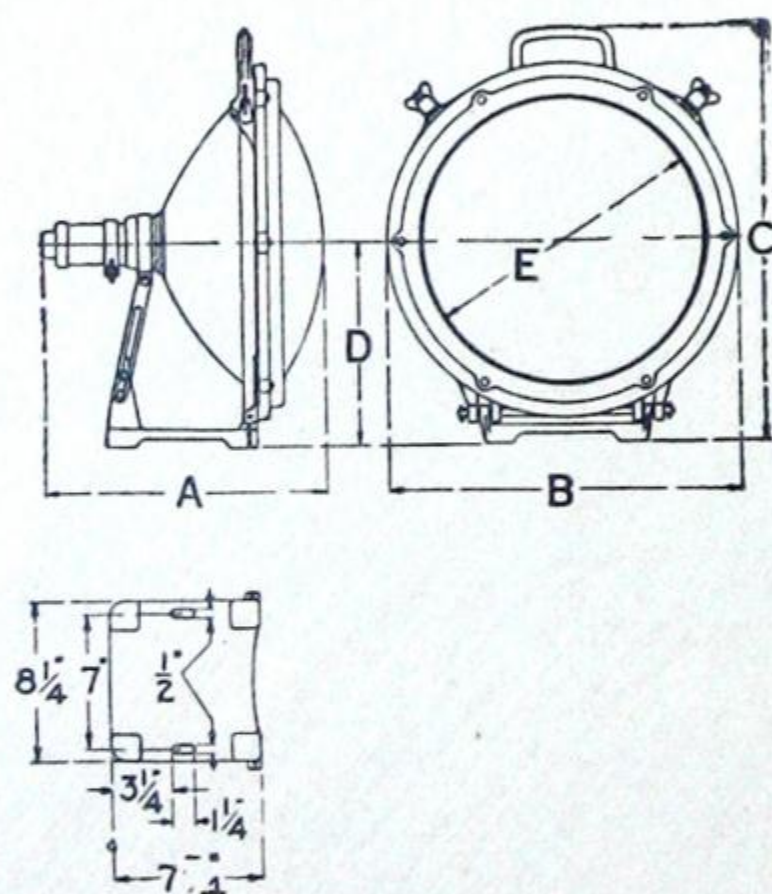


FIG. 1. FORMS L-1 AND L-3

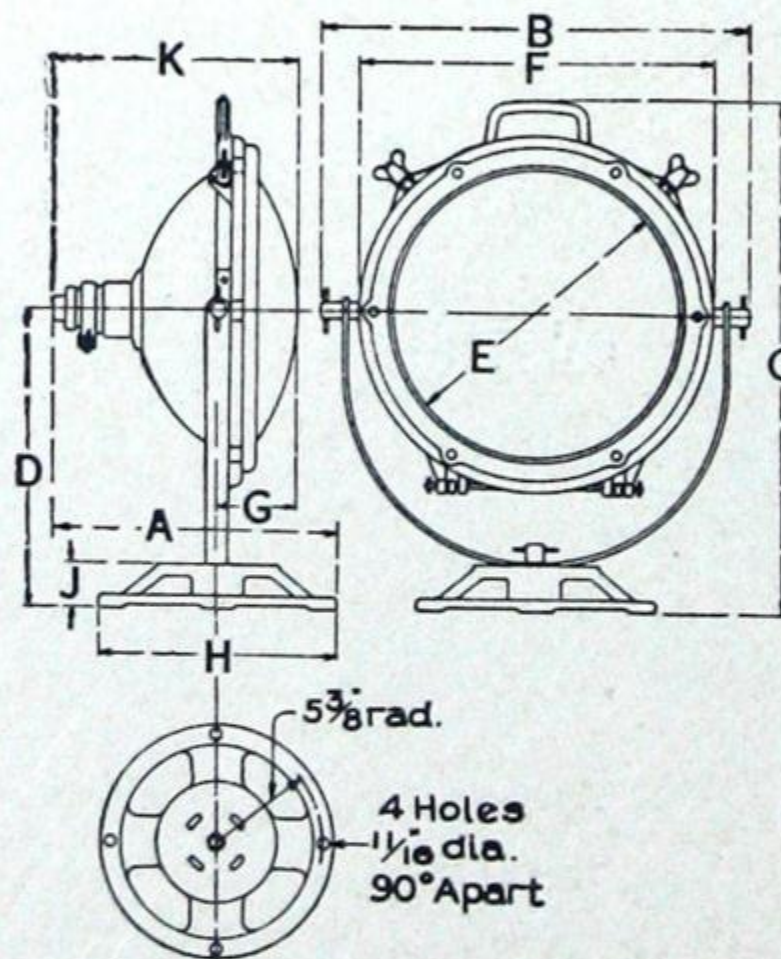


FIG. 2. FORMS L-1 AND L-3

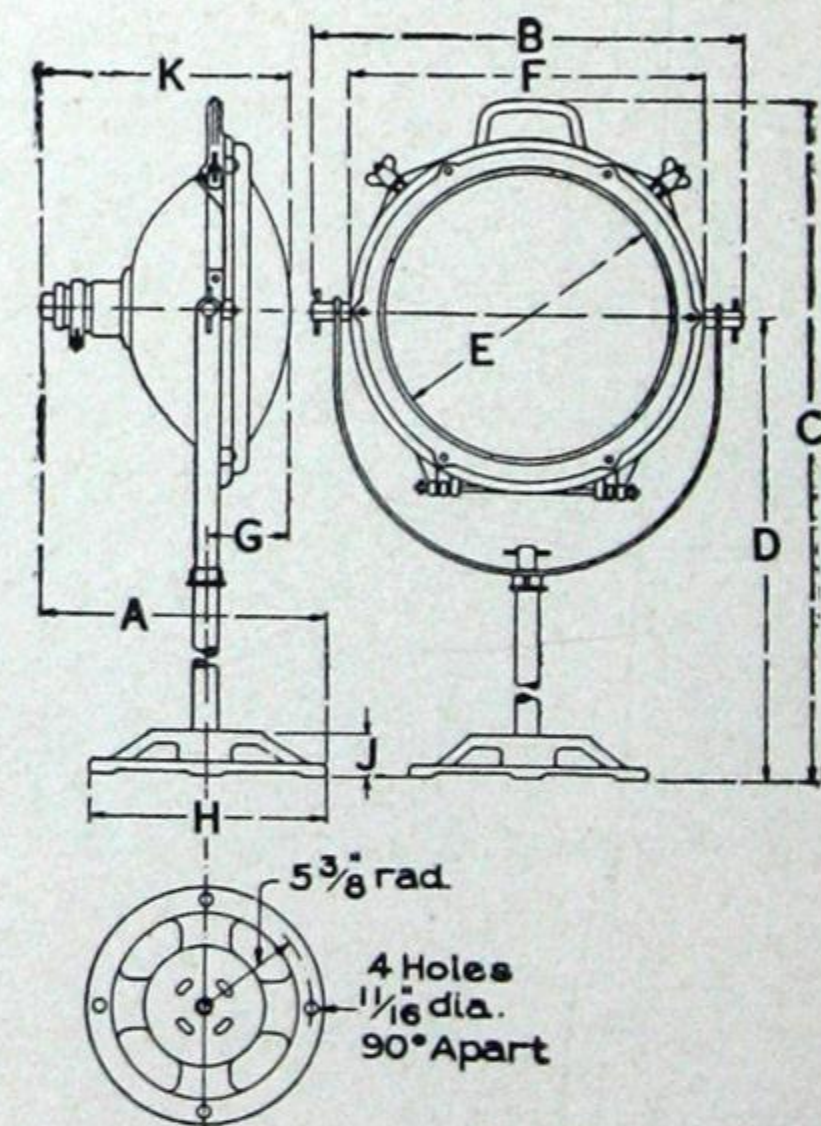


FIG. 3. FORMS L-1 AND L-3

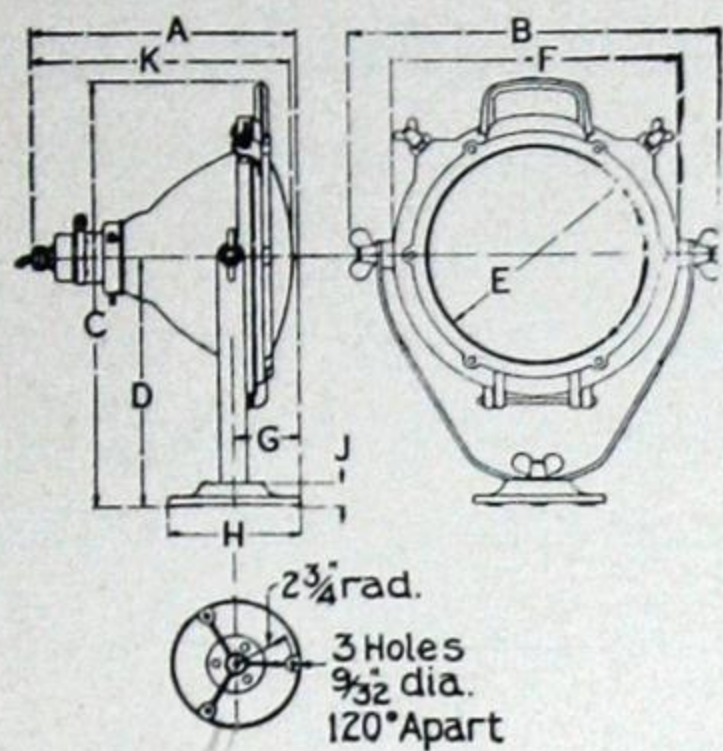


FIG. 4
FORMS L-9 AND L-11

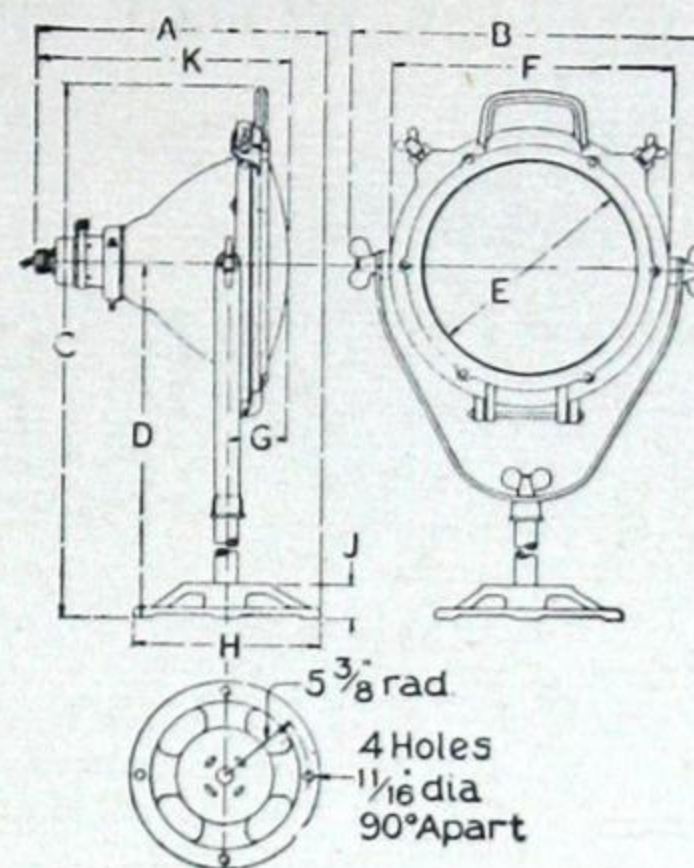


FIG. 5
FORMS L-9 AND L-11

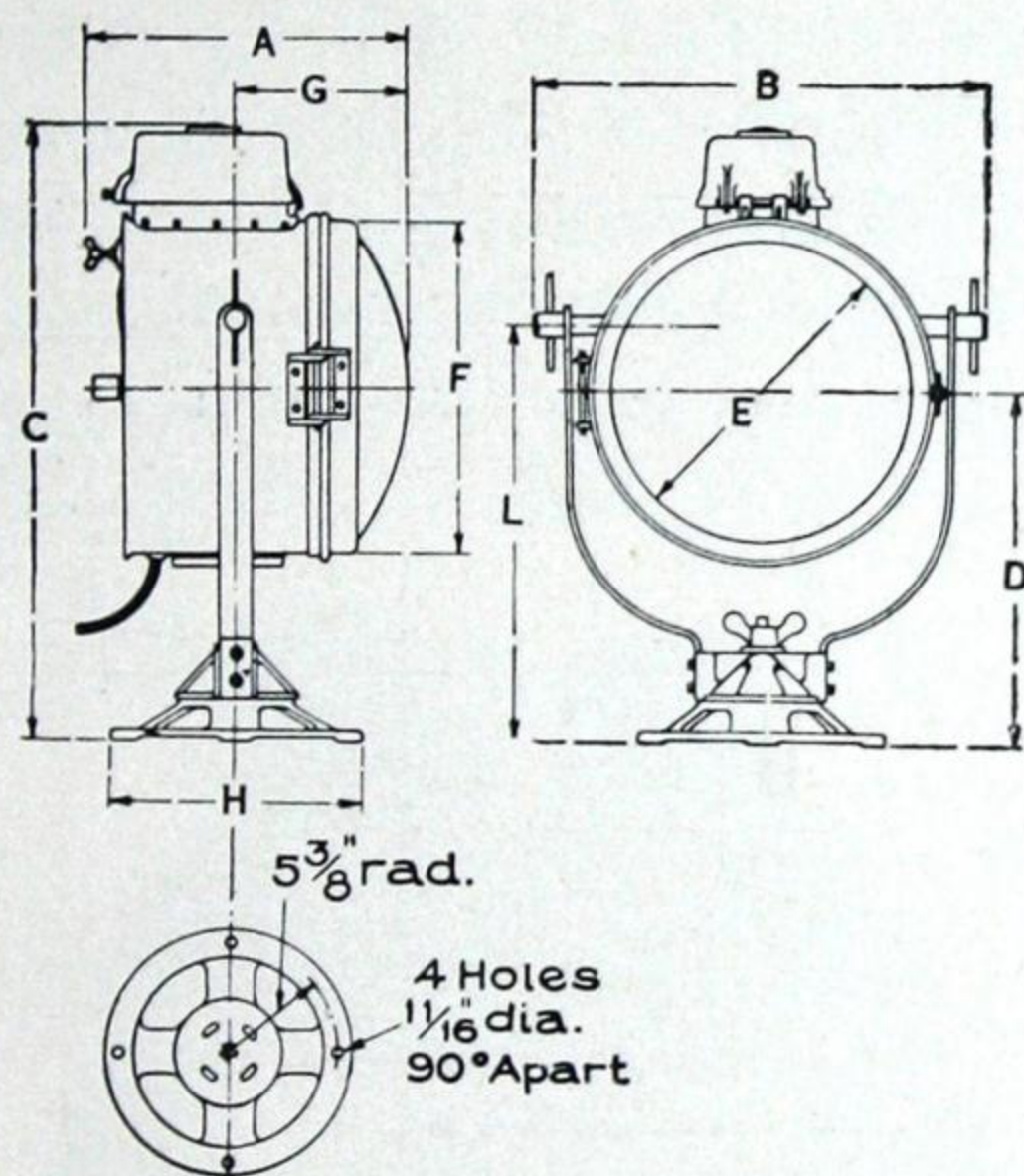


FIG. 6
FORM L-15

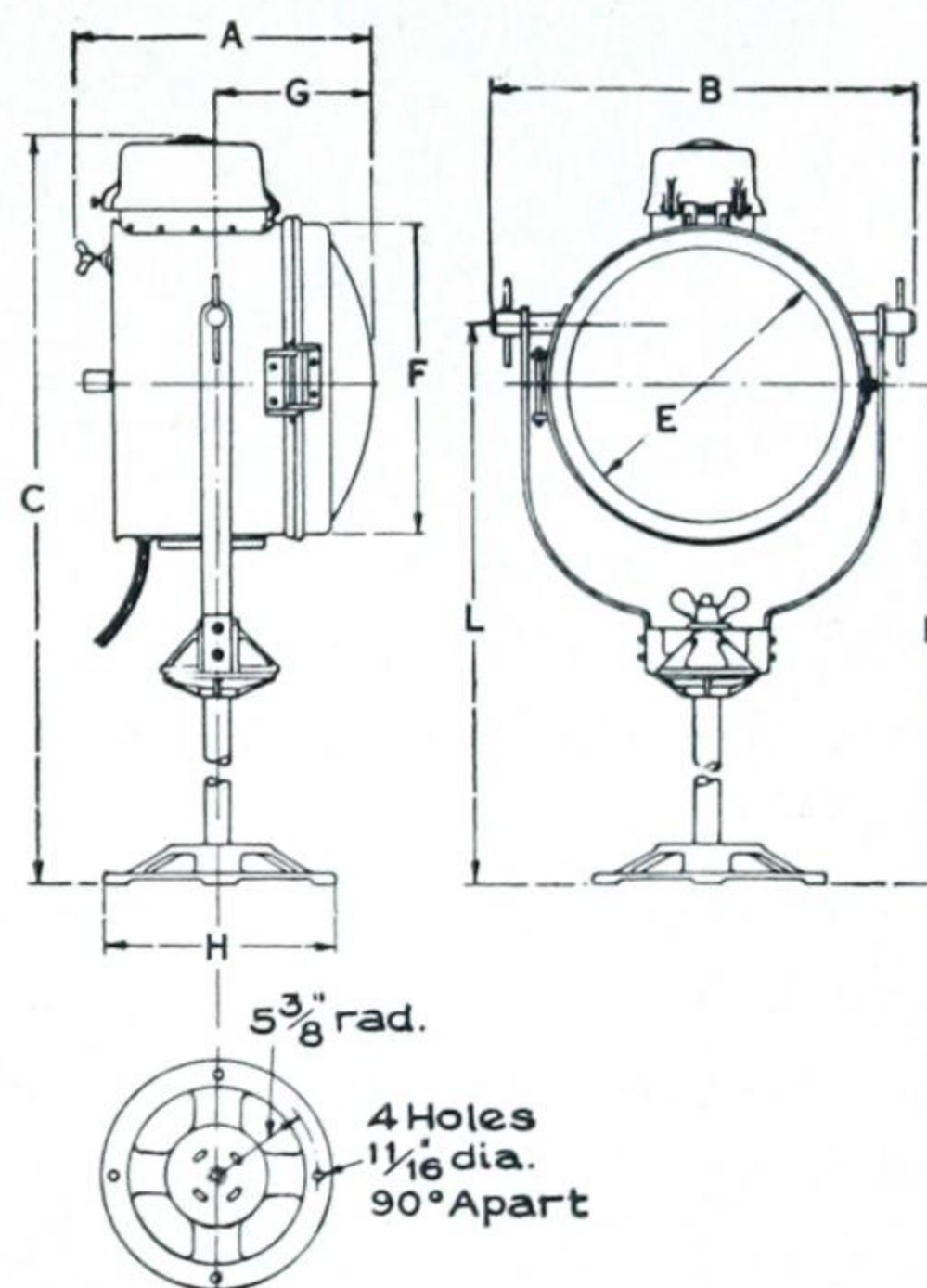


FIG. 7
FORM L-15

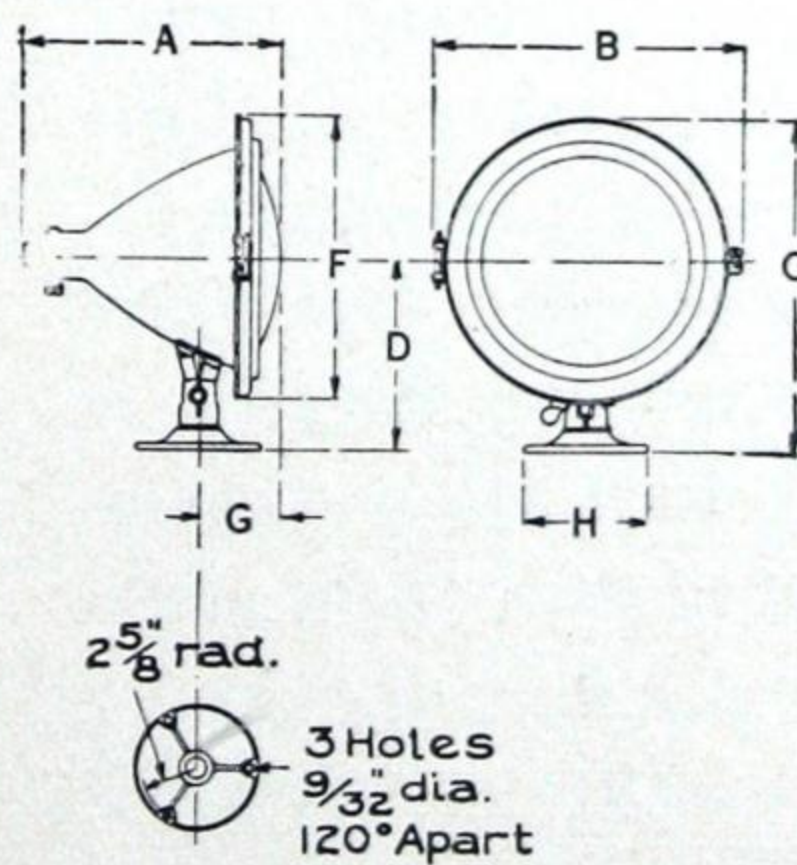


FIG. 8
FORM L-20

Forms L-22 and L-24 Projectors



FORM L-22 FLOODLIGHTING PROJECTOR
WITH STIPPLED GLASS DOOR

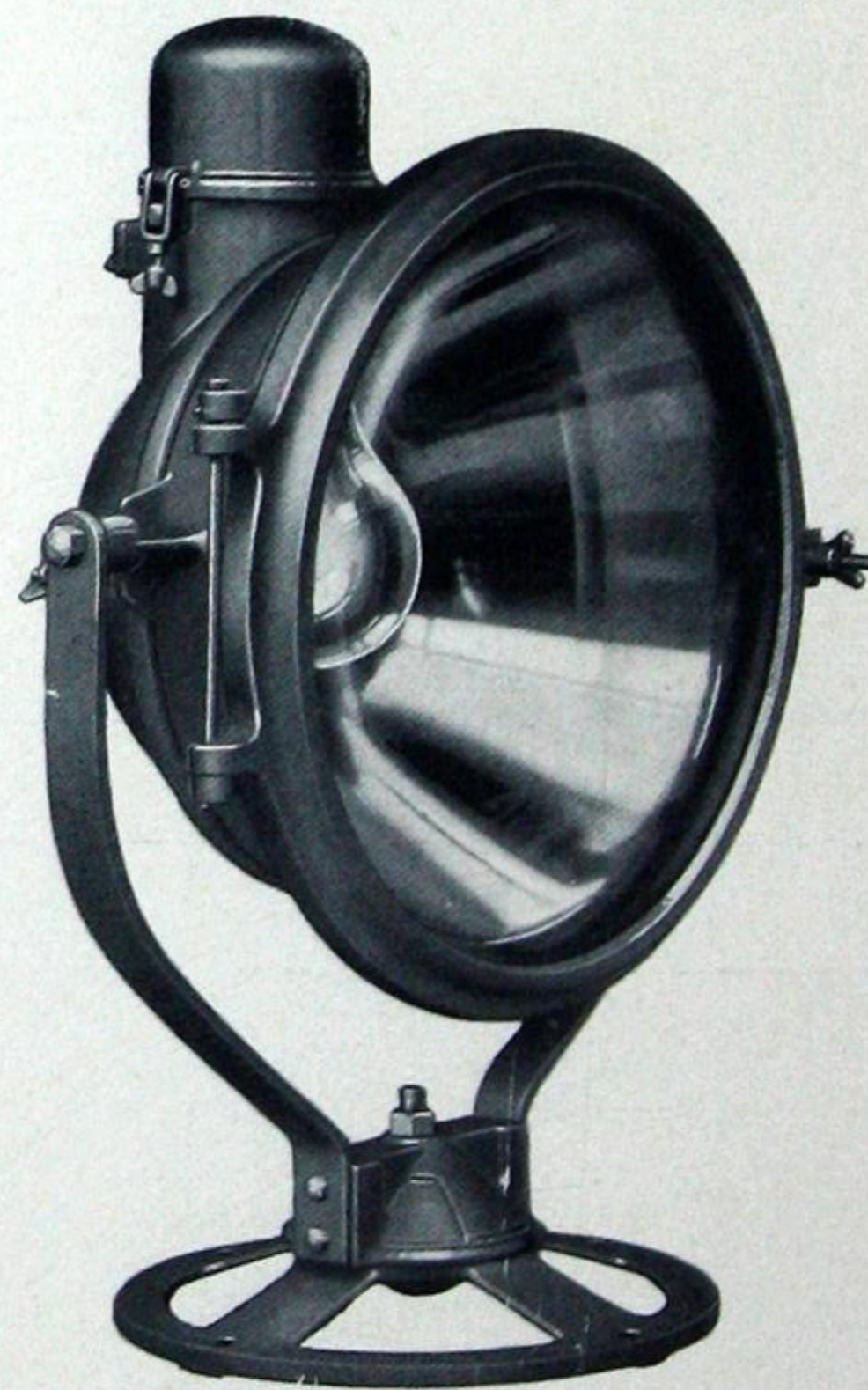
beam. Obviously, a narrow beam of high candle-power is not suited to this service, for, while it is capable of transmitting the light a great distance, the result is merely a spot of light in the yard. It is, therefore, desirable to use a beam sufficiently spread to obtain the coverage found necessary in practice, and of great enough candle-power to provide the desired illumination at distances corresponding to the usual projector spacings.

Through years of research, General Electric scientists have amassed a fund of knowledge in the field of lighting. This enables them to give expert consideration to the proper balance of lumens, candle-power, and beam spread in the design of the Form L-22 projector. Thus the maximum efficiency is obtained that is consistent with those characteristics determined as the most advantageous from the stand point of the distribution of light.

The severe operating conditions encountered in a railroad yard demand a floodlighting projector of

THE importance of the floodlighting projector to the success of a railroad yard-lighting system cannot be over-estimated. Although the system may be accurately laid out and the towers properly spaced unless the design of the floodlighting projector is fundamentally correct from the illuminating engineering standpoint, the resultant lighting will not be satisfactory.

The suitability of a projector for railroad yard lighting is determined by the total lumens delivered by the projector, its beam lumens, and the beam candle-power. The total lumens are the measure of the total flux of light delivered by the projector; the beam lumens are the quantity of light flux in the beam; while the candle-power is the measure of the pressure or intensity of the light. As railroad yard lighting falls in the general classification of large-area lighting, consideration must be given to the coverage of the projector; that is, to the spread of the



FORM L-24 FLOODLIGHTING PROJECTOR
WITH CLEAR GLASS DOOR

special mechanical construction. The presence of sulphuric acid gases in the locomotive smoke requires the use of a material, for the construction of the projectors, which is impervious to attack from these gases. As the units are exposed to all kinds of weather, they must be weatherproof and rust-resisting. After a study of these requirements, a cast aluminum alloy construction was decided upon for the Form L-22 floodlighting projector.

The projectors are usually mounted on a platform at the top of a high tower, where space for a maintenance man is very limited. In addition, they are usually placed at the edge of the platform with the beam turned outward, so as to utilize all the stray light. As it is occasionally necessary to relamp or



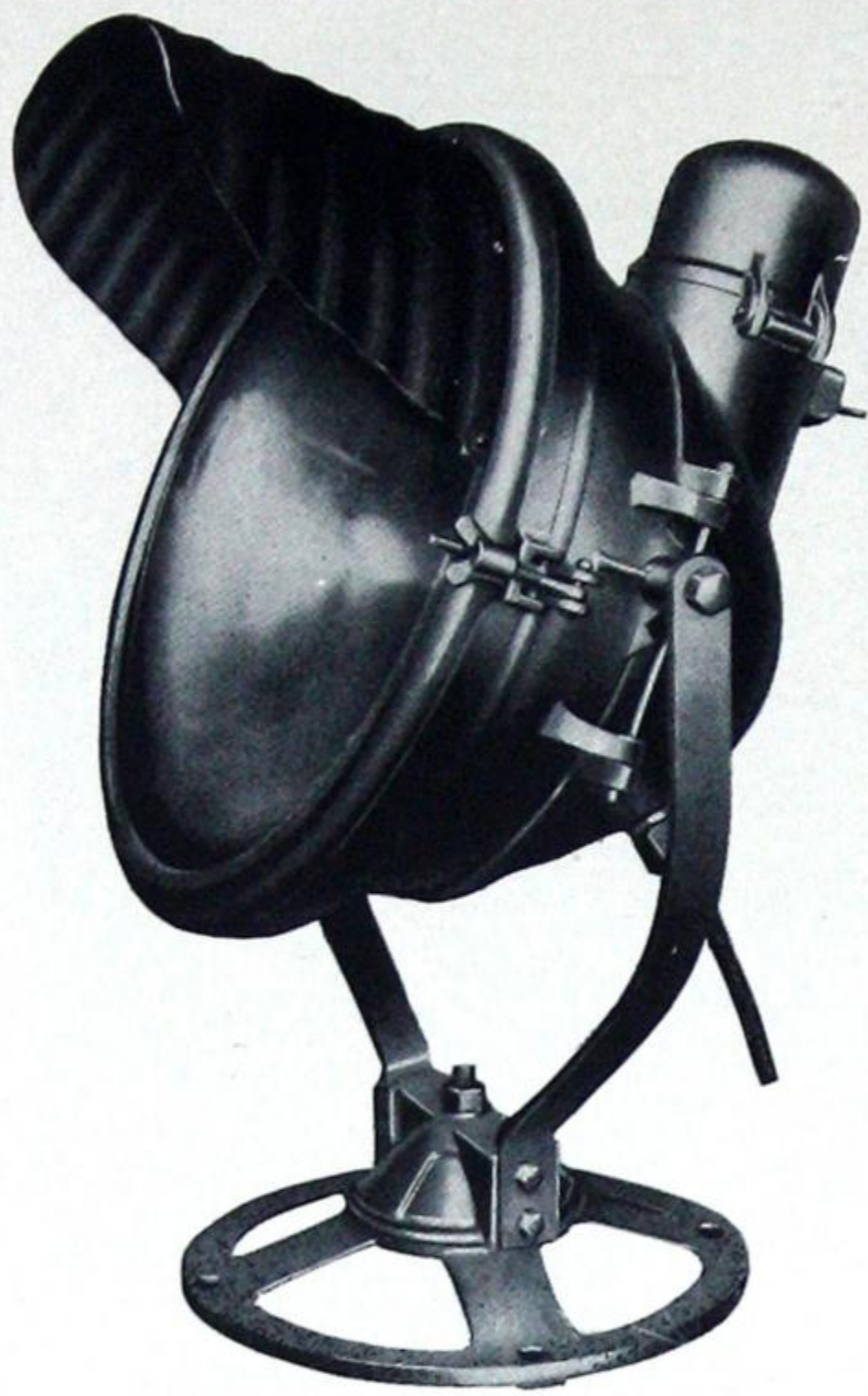
FORM L-22 FLOODLIGHTING PROJECTOR WITH
CLEAR GLASS DOOR OPENED



REAR VIEW OF FORM L-22
FLOODLIGHTING PROJECTOR

clean the projector, this operation must be made as simple and safe as possible. If access to the interior of the projector can be gained only through the front door, the workman is placed in a precarious position unless the projector is turned around, and where this is done to permit the workman safely to inspect the interior, the likelihood of the beam being correctly oriented when the projector is turned back into place is exceedingly remote. In the General Electric Form L-22 floodlight, this difficulty has been solved by the use of a hinged rear door in which the lamp is mounted. This enables the workman to relamp or clean the projector without endangering his own safety or altering the position of the projector in any way.

The Form L-22 floodlighting projector, shown on these pages is designed for intensive large-area lighting, and is especially suited to the lighting of railroad yards. Standard 110- or 220-volt, 300- to 1000-watt lamps, burning tip-down, can be used, although the most economical results are obtained with the 1000-watt lamp.



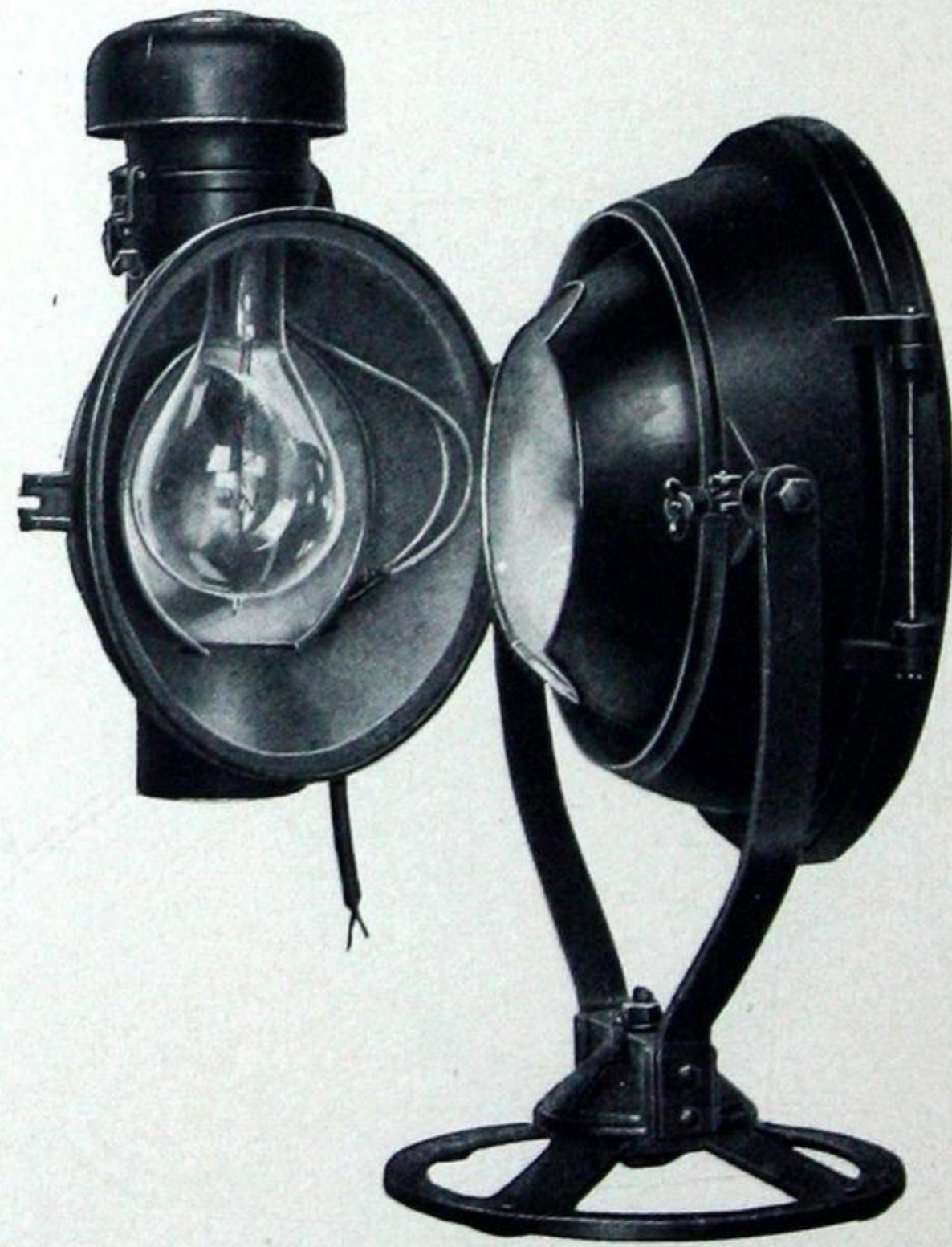
FORM L-24 FLOODLIGHTING PROJECTOR,
SHOWING APPLICATION OF
REFLECTING VIZOR

This unit has a cone-shaped, two-part casing, a front door being hinged to the forward section. The hinged rear section permits the projector to be relamped or cleaned without disturbing the direction of the beam. A shielded outlet at the top and a perforated intake at the bottom of the rear section provide for ventilation. A split ball-and-socket type of focusing mechanism, with a single clamping screw, allows the lamp socket to be moved in any direction. This freedom of movement is absolutely necessary in order to focus the lamp accurately.

When the Form L-22 floodlighting projector was introduced, the consensus of railway engineering opinion recommended provision for ventilation. Subsequent experience with this projector in various railroad yards has demonstrated the need under certain conditions for a unit without ventilation openings. To meet this new requirement, a variation of the Form L-22, without provision for ventilation, has been developed. This new projector, Form L-24, is identical in all other

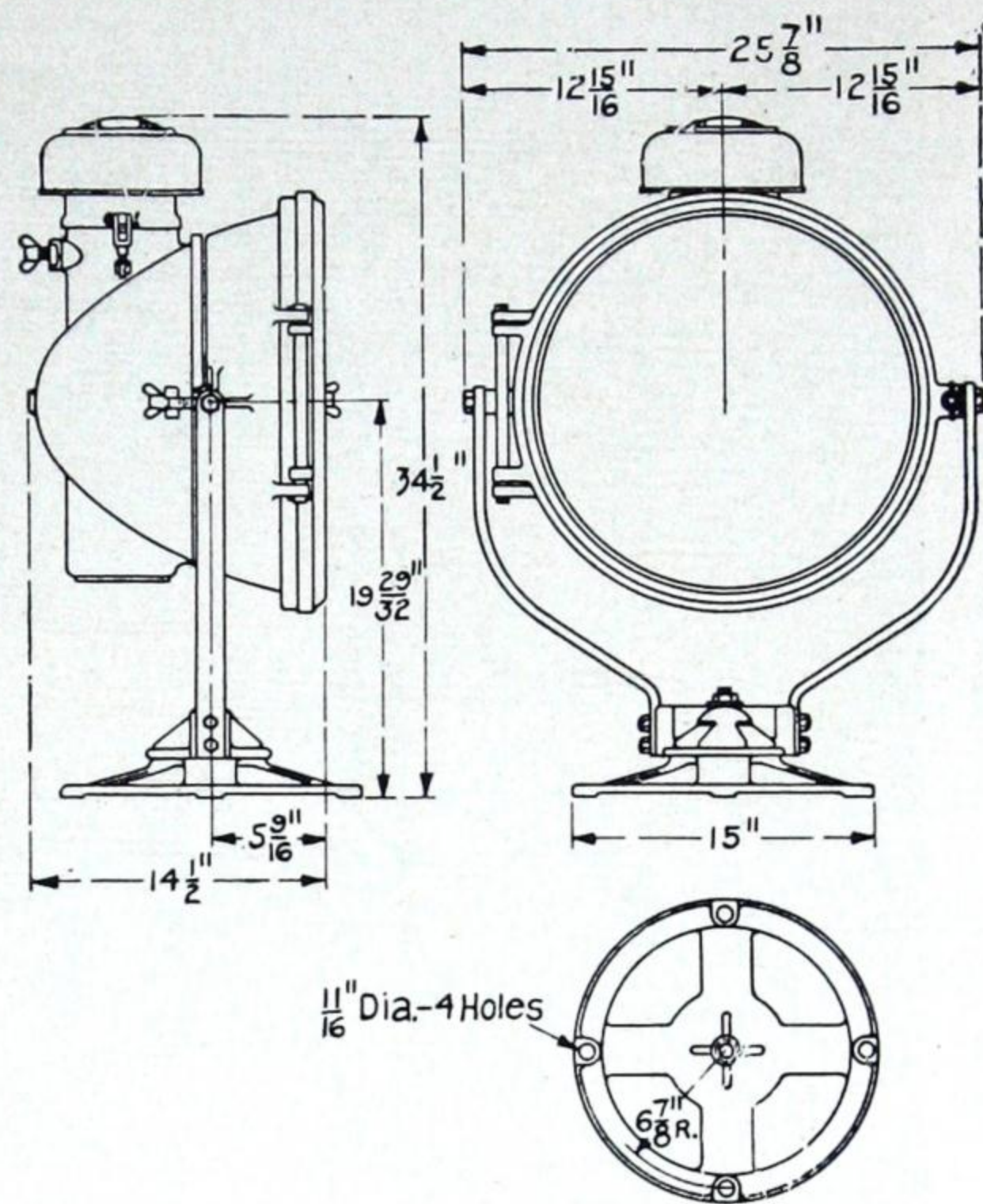
respects to the standard Form L-22, and either can be furnished, depending upon the specific requirements.

These projectors are provided with two reflectors: one, of patented parabolic shape, is attached to the forward section of the casing; the other, a shallow, composite parabolic and spherical section, is attached to the rear hinged section. These reflectors are of blown glass, silvered and hermetically sealed by a heavy coating of electrolytic copper which entirely envelops the outer surface of the mirrors. This copper coating protects the glass and assists in radiating the heat from the lamp. As the inner surface of the reflectors is of glass, they are immune to attack from the elements. This special design of the reflectors gives a high-beam candle power, consistent with the best lighting results, and a total output that is exceptionally high.

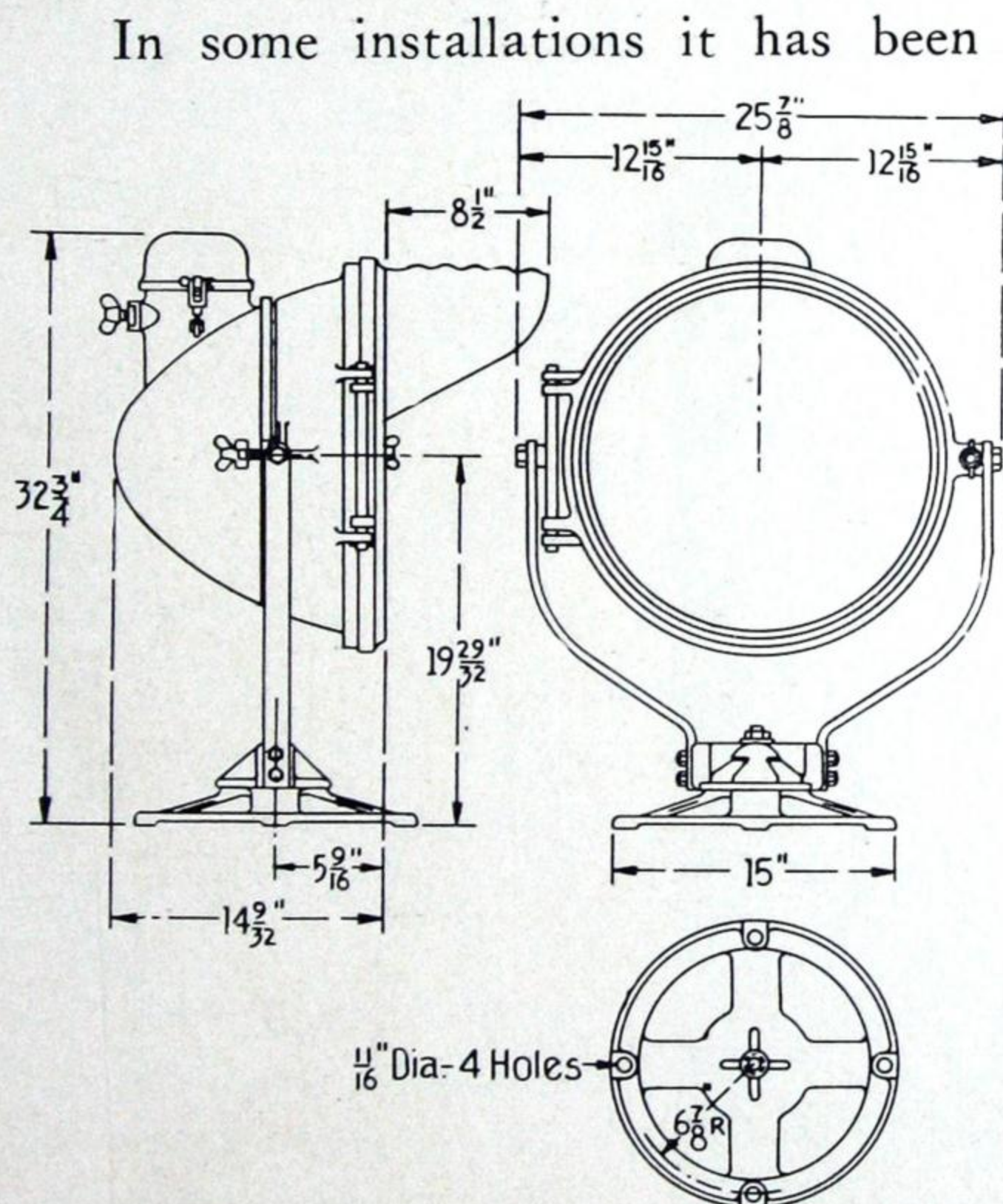


HINGED REAR SECTION OPENED SHOWING
EASE OF ACCESS TO INTERIOR OF
FORM L-22 PROJECTOR

These units are furnished with a front door of heat-resisting pressed glass, either clear or lightly stippled. The light stipple in the glass smooths out any high spots in the beam. The casing and door of these projectors are cast aluminum alloy, while the ventilating cowl on the Form L-22 is copper. The trunnion bracket is band iron heavily lead plated. The swivel and base are cast iron similarly plated. The trunnion bracket and swivel base allow the adjustment of the beam in any direction. All joints are made weatherproof by the use of sponge rubber and marlin gaskets. The screws and bolts are made of non-rusting materials. These units are finished in black japan, which also assists in radiating the heat. The dimensions of the Form L-22 and the Form L-24 projectors are shown on this page.



DIMENSIONS OF FORM L-22
FLOODLIGHTING PROJECTOR



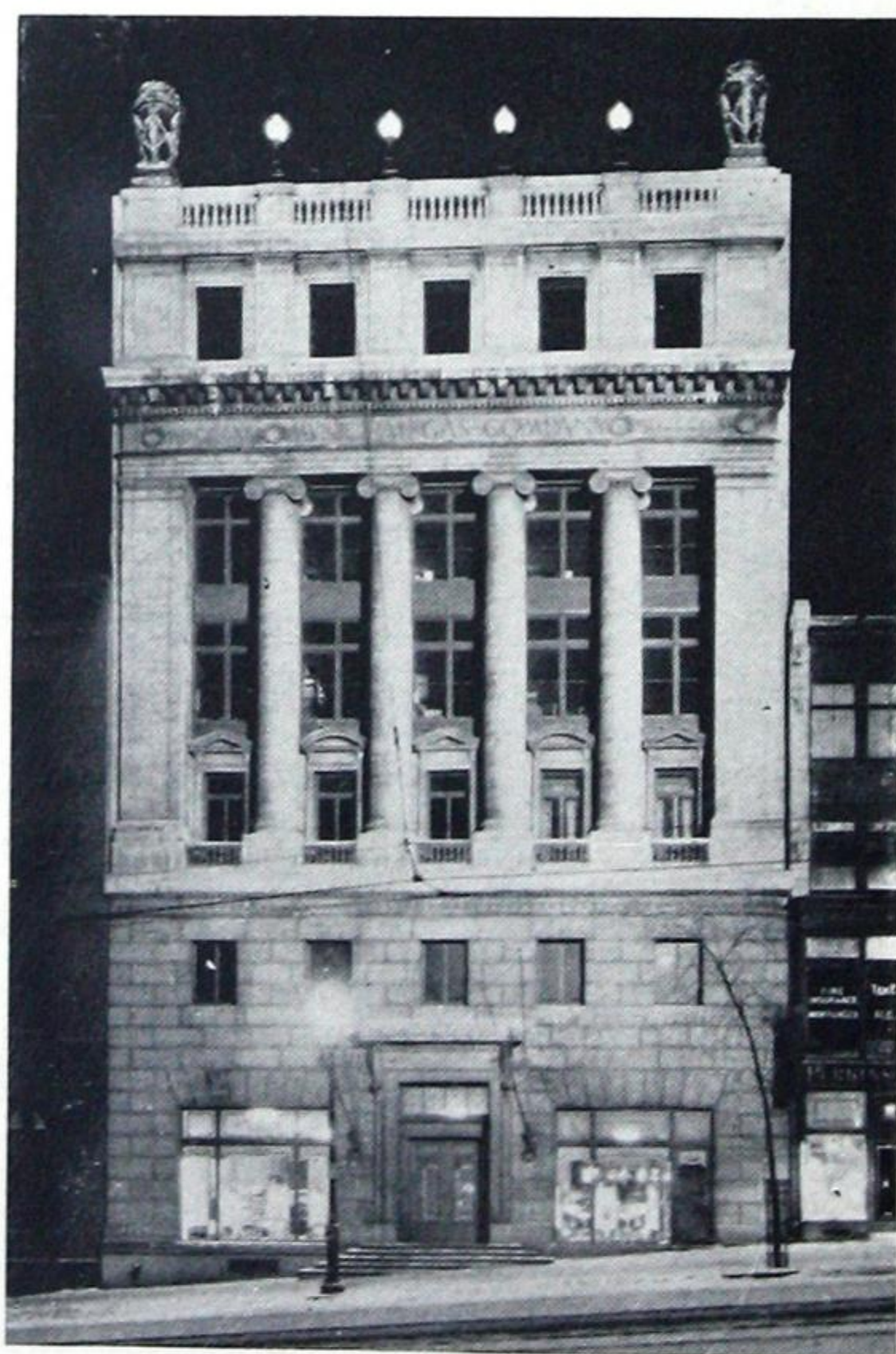
DIMENSIONS OF FORM L-24 FLOODLIGHTING
PROJECTOR AND REFLECTING VIZOR

In some installations it has been noticed that the intensity of illumination on the area directly below the tower is much less than that at a distance from the tower, where the full beam of the projector falls. Especially is this true of systems where the light is projected in both directions from one tower. To improve the illumination directly below the tower, a reflecting vizer has been designed to fit on the top of the door, and it can be added at small expense to either the standard Form L-22 floodlighting projector, or the new Form L-24 non-ventilated type. This shield reflects a portion of the stray light above the beam to the ground directly below the tower, and another part of this light to the foreground. The dimensions and location of this shield are also shown among the accompanying views.

The advantages of railroad yard lighting, what railroad yard lighting is, and how it is accomplished, are explained in a new bulletin, GEA-131. Copies of this publication are available at all G-E Sales Offices.



CAPITOL BUILDING, WASHINGTON, DISTRICT OF COLUMBIA



MUNICIPAL GAS CO., ALBANY, NEW YORK
Marcus P. Reynolds, Architect

Planning a Floodlighting Installation

THE installation of floodlighting projectors is usually made by an electrical contractor, who is not familiar with the theoretical methods for determining the proper equipment and its location. The solution of a typical problem illustrating the use of the tables on pages thirty-six and thirty-seven, is given below and should be of considerable assistance.

A foot-candle is the intensity of the light produced by a standard candle at a distance of one foot, while a lumen is the quantity of light necessary to produce one foot-candle of illumination over an area of one square foot. These are universally accepted as convenient units of light measure. As a guide for the comparison of intensity values, it will be well to remember that full moonlight corresponds to approximately 0.025 foot-candles.

To furnish an example of the application of the data given in Table I, a problem involving the lighting of an area of 2000 sq. ft. will be computed. The conditions require the units to be installed 130 ft. from the surface to be illuminated. The color of the building surface is dark. What type of floodlighting unit should be used? What are the intensity and the number of units required?

In solving this problem the three controlling conditions are:

- (1) The floodlights are to be located 130 feet from the illuminated surface.
- (2) The object to be floodlighted is in a white-way section.
- (3) The surface to be illuminated has a dark finish.

Table I shows that all the projectors, except the L-3, can be used up to a working distance of about 130 feet when equipped with clear-glass doors.

Table II shows that the intensity required for dark surfaces in white-way sections is 20 ft-cd. Assume that the L-15 projector in Table I is selected from which can be determined the number of units necessary to illuminate the area to an intensity of 20 ft-cd. Follow the vertical line from 2000 sq. ft. until it crosses the 20 ft-c. curve; then by following the horizontal line to the left it will be found that seven floodlights should be used. Care should be taken of course to provide sufficient overlapping of the beams to insure even illumination over the entire surface. This example will adequately illustrate all high-intensity floodlighting problems.

Table I also includes data of diameters, areas, and foot-candle intensity of each unit with clear-glass and with stippled-glass doors. A typical problem making use of this information will be given. An area of about 1800 sq. ft. is to be illuminated. The units are to be installed 250 ft. from the illuminated area, there being no other source of light. The set of 250-ft. working distance readings in Table I is reproduced in Table III and show that the L-1 beam will cover an area of 1810 sq. ft. with approximately forty times the intensity of moonlight.

It should be remembered that the average foot-candle intensities given in Table I indicate values produced by one unit alone. To increase these intensities additional units must be used.

For the various floodlighting units, Table IV gives the lamp wattages, lamp lumens, total lumens, and beam lumens for both clear-glass and stippled-glass doors. It will be further observed that a formula is given at the bottom for determining the number of projectors.

FORM L-1

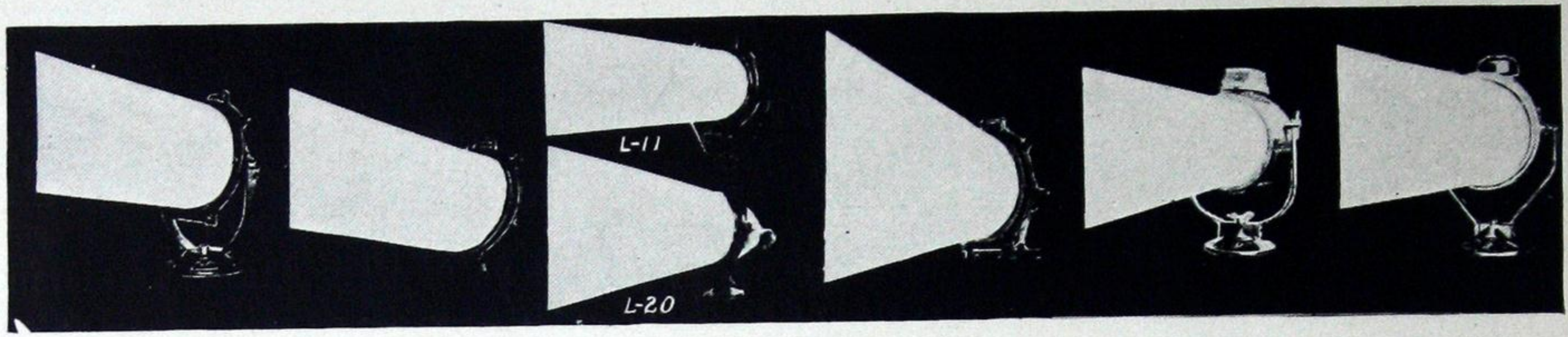
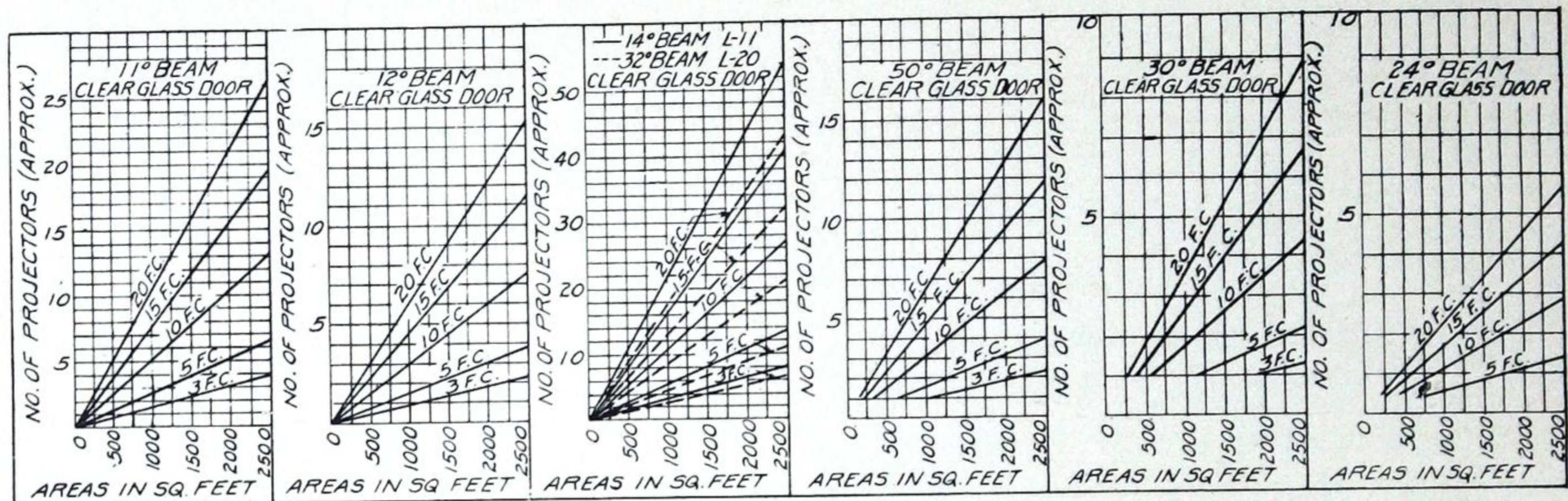
FORM L-9

FORMS L-11 AND L-20

FORM L-3

FORM L-15

FORMS L-22 AND L-24

WORKING DISTANCE
115 TO 370 FEETWORKING DISTANCE
105 TO 340 FEETWORKING DISTANCE
90 TO 290 FEET
40 TO 125 FEETWORKING DISTANCE
25 TO 76 FEETWORKING DISTANCE
42 TO 132 FEETWORKING DISTANCE
52 TO 168 FEET

* TABLE I

Dis. from Proj'r. in Ft.	Dia. Ft.	Area Sq. Ft.	Ave. F.C.	Dia. Ft.	Area Sq. Ft.	Ave. F.C.	Dia. Ft.	Area Sq. Ft.	Ave. F.C.	Dia. Ft.	Area Sq. Ft.	Ave. F.C.	Dia. Ft.	Area Sq. Ft.	Ave. F.C.	Dia. Ft.	Area Sq. Ft.	Ave. F.C.
CLEAR GLASS DOOR																		
25	4.8	18.2	106	5.2	21	156	6.1	14.3	29	161	31.8	7.25	23	416	7.60	13.4	141	39.7
50	9.6	73	26.4	10.5	86	38	12.3	28.7	119	644	7.7	1.82	47	1735	1.81	26.8	564	9.95
75	14.4	163	11.8	15.7	194	16.9	18.4	43.0	265	1452	3.47	0.805	70	3849	0.820	40.2	1270	4.41
100	19.3	293	6.6	21.0	346	9.4	24.6	57.4	476	2585	1.92	0.450	93	6793	0.465	54.0	2290	2.44
125	24.0	452	4.26	26.4	548	5.98	30.7	71.7	740	4057	1.24	0.290				67.0	3526	1.59
150	28.8	652	2.96	31.4	773	4.25	36.8		1063		0.865					80.5	5090	1.10
175	33.6	888	2.17	36.8	1060	3.09	43.0		1452		0.630					94.0	6940	0.810
200	38.5	1164	1.66	42.0	1385	2.37	49.2		1900		0.485					108.0	9161	0.610
250	48.0	1810	1.07	52.4	2154	1.52	61.4		2958		0.311					134.0	14103	0.396
300	57.5	2597	0.745	63.0	3117	1.05	73.6		4257		0.216					161.0	20358	0.275
350	67.4	3565	0.540	73.6	4257	0.770												
400	77.2	4680	0.413	84.0	5541	0.592												
450	86.4	5859	0.330	94.5	7013	0.470												
500	96.0	7238	0.267	105.0	8659	0.378	L-11	L-20	L-11	L-20	L-11	L-20						
STIPPLED GLASS DOOR																		
20	23.1	420	5.65	18.6	272	13.6	25.0	25.5	491	511	2.34	2.43	40	1256	3.32	40	1256	6.75
30	34.6	942	2.51	28.0	616	6.00	37.6	38.2	1111	1145	1.03	1.08	60	2827	1.47	60	2827	3.00
40	46.2	1680	1.41	37.4	1097	3.38	50.0	51.0	1963	2043	0.598	0.61	80	5026	0.83	80	5026	1.68
50	57.8	2625	0.900	46.8	1720	2.15	62.6	63.6	3080	3179	0.370	0.39	100	7854	1.08	100	7854	1.08
60	69.2	3766	0.620	56.0	2463	1.50	75.0	76.4	4418	4581	0.260	0.27	120	11310	0.75	120	11310	0.75
70	80.1	5042	0.460	65.3	3348	1.10							140	15394	0.55	140	15394	0.55
80	92.4	6702	0.350	74.6	4374	0.845							160	20106	0.42	160	20106	0.42
90	104.0	8495	0.275	84.0	5541	0.670							180	25447	0.33	180	25447	0.33
100	115.5	10477	0.223	93.3	6829	0.540	L-11	L-20	L-11	L-20	L-11	L-20	200	31415	0.27	200	31415	0.27

* Refer to note at bottom of page 37.

TABLE II

BUILDING SURFACES	CHARACTER OF SURROUNDINGS		
	WHITE WAY	RESIDENCES	PARKS
DARK COLORED BLDG. I.E., SURFACES OF RED BRICK, CLINKER BRICK, BROWN STONE, ETC. . . .	20 F.C.	15 F.C.	10 F.C.
MEDIUM COLORED BUILDING, I.E., SURFACES OF CONCRETE, GRANITE, ETC.	15 F. C.	10 F.C.	5 F.C.
LIGHT COLORED BUILDING, I.E., SURFACES OF GLAZED TERRA COTTA, MARBLE, ETC.	10 F.C.	5 F.C.	3 F.C.

* TABLE III

	FORM L-1	FORM L-9	FORM L-11	FORM L-15	FORM L-22
BEAM SPREAD, DEG.	11°	12°	14°	30°	24°
BEAM DIAMETER, FT.	48	52.4	61.4	134	106
BEAM AREA, SQ; FT.	1810	2154	2958	14103	8225
AVERAGE, FOOT-CANDLES.	1.07	1.52	0.311	0.396	1.07

* Refer to note at bottom of this page.

* TABLE IV

FORM	LAMP	WATTS	RE-FLECT-OR	LAMP LU-MENS	TOTAL LU-MENS	BEAM LU-MENS	BEAM WIDTH
CLEAR GLASS LENS							
L-1	Fl. Ltg.	500	Metal	7850	4655	1930	11°
L-9	Fl. Ltg.	500	Glass	7850	5870	3280	12°
L-11	Fl. Ltg.	250	Glass	3140	1677	920	14°
L-20	Standard	200	Glass	3000	1860	1170	32°
L-3	Fl. Ltg.	500	Glass	7850	4770	3150	50°
L-15	Standard	1000	Glass	20000	11500	5600	30°
L-22	Standard	1000	Glass	20000	14120	8825	24°
STIPPLED GLASS LENS							
L-1	Fl. Ltg.	500	Metal	7850	4450	2365	60°
L-9	Fl. Ltg.	500	Glass	7850	5570	3700	50°
†L-11	Fl. Ltg.	250	Glass	3140	1642	1150	64°
L-20	Standard	200	Glass	3000	1645	1240	65°
L-3	Fl. Ltg.	500	Glass	7850	4510	4160	90°
L-15	Standard	1000	Glass	20000	10360	8460	90°
L-22	Standard	1000	Glass	20000	13800	8950	32°

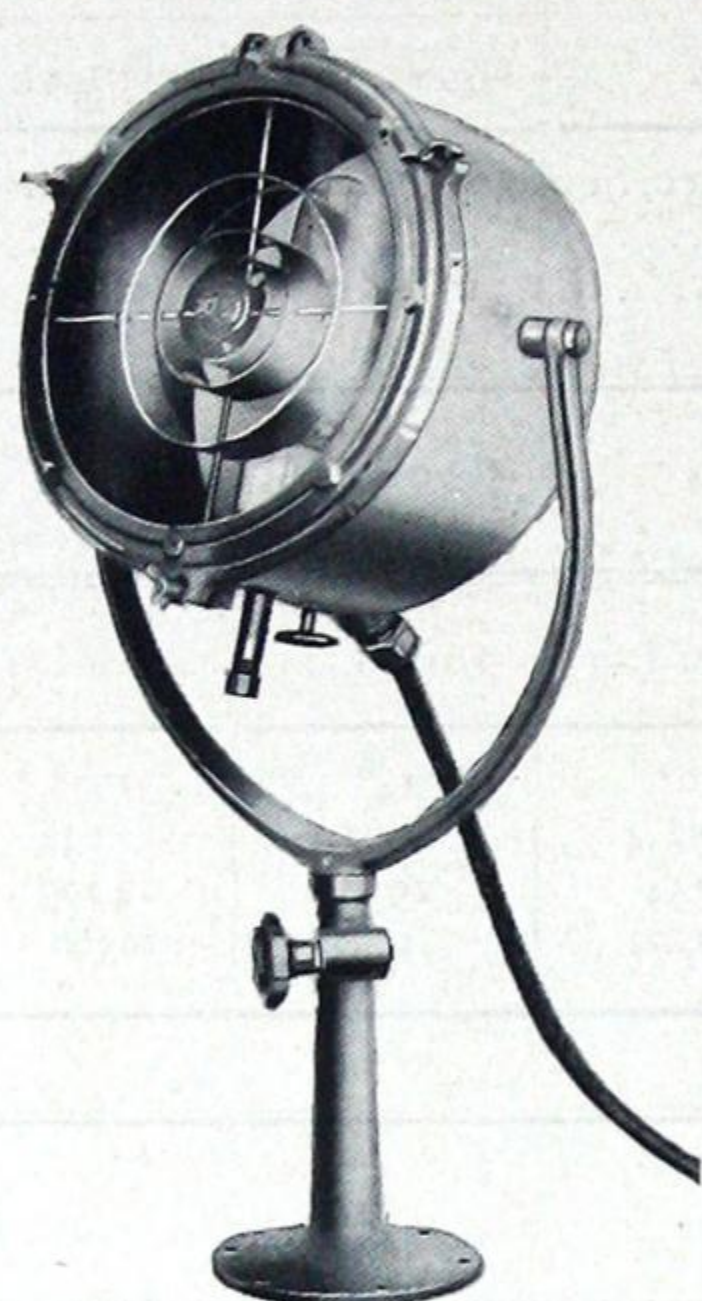
* Refer to note at bottom of this page.
† Frosted Lens.

$$\text{NUMBER OF PROJECTORS} = \frac{\text{AREA OF BLDG. FACADE} \times \text{F.C. REQUIRED}}{\text{BEAM LUMENS OF ONE PROJECTOR}}$$

NOTE: Since the development of these tables, the efficiency of MAZDA lamps has been slightly increased. All illumination data should be multiplied by the constant K as shown in the table below.

LAMP WATTAGE	OLD LAMP LUMENS	NEW LAMP LUMENS	K
200	3000	3200	1.067
250	3140	3375	1.074
500	7850	8150	1.039
1000	20000	21000	1.050

G-E Incandescent Searchlights



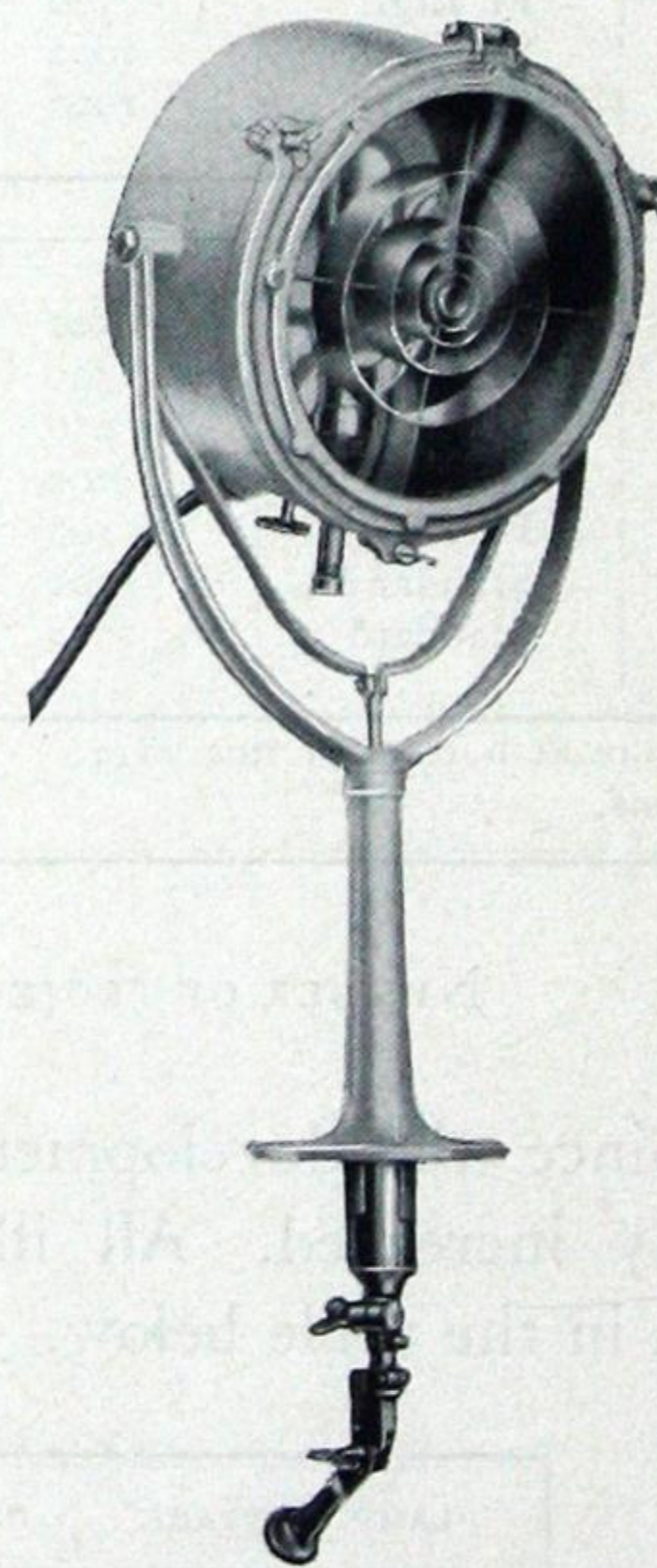
FORM J-69 HAND CONTROL
CAT. No. 297508

GENERAL Electric illuminating Engineers have devoted considerable time and attention to the design and construction of incandescent searchlights for all purposes. Those described in this bulletin are intended primarily for installation on dredges, tug-boats, and other harbor craft, in order to facilitate operations at night, and should not be confused with the larger and higher candle-power arc searchlights with which warships and ocean liners are usually equipped. The latter have high initial and operating costs, which are usually prohibitive in comparison with those of the incandescent units, and are therefore seldom used for spectacular advertising and floodlighting effects.

The floodlighting projectors previously described are for installation at comparatively short range, that is, at distances less than 500 feet from the object to be illuminated. There are, however, many instances where it is impossible to locate the lighting units within this range, and the narrow, penetrating beam, characteristic of the incandescent searchlight, can be utilized to advantage. These are also equipped with high-efficiency MAZDA lamps and offer great flexibility in respect to lamp sizes.

While these units are not directly classified as floodlights, they are often a valuable supplement to a floodlighting installation. The illumination of statues and small architectural details which often surmount notable buildings, is easily accomplished by this type of projector.

The J-68 incandescent searchlight was designed for use on 75-foot power boats similar to those of the New York Harbor Police and Federal Agents. It is made for mounting on the roof of the pilot house and can be controlled from within by

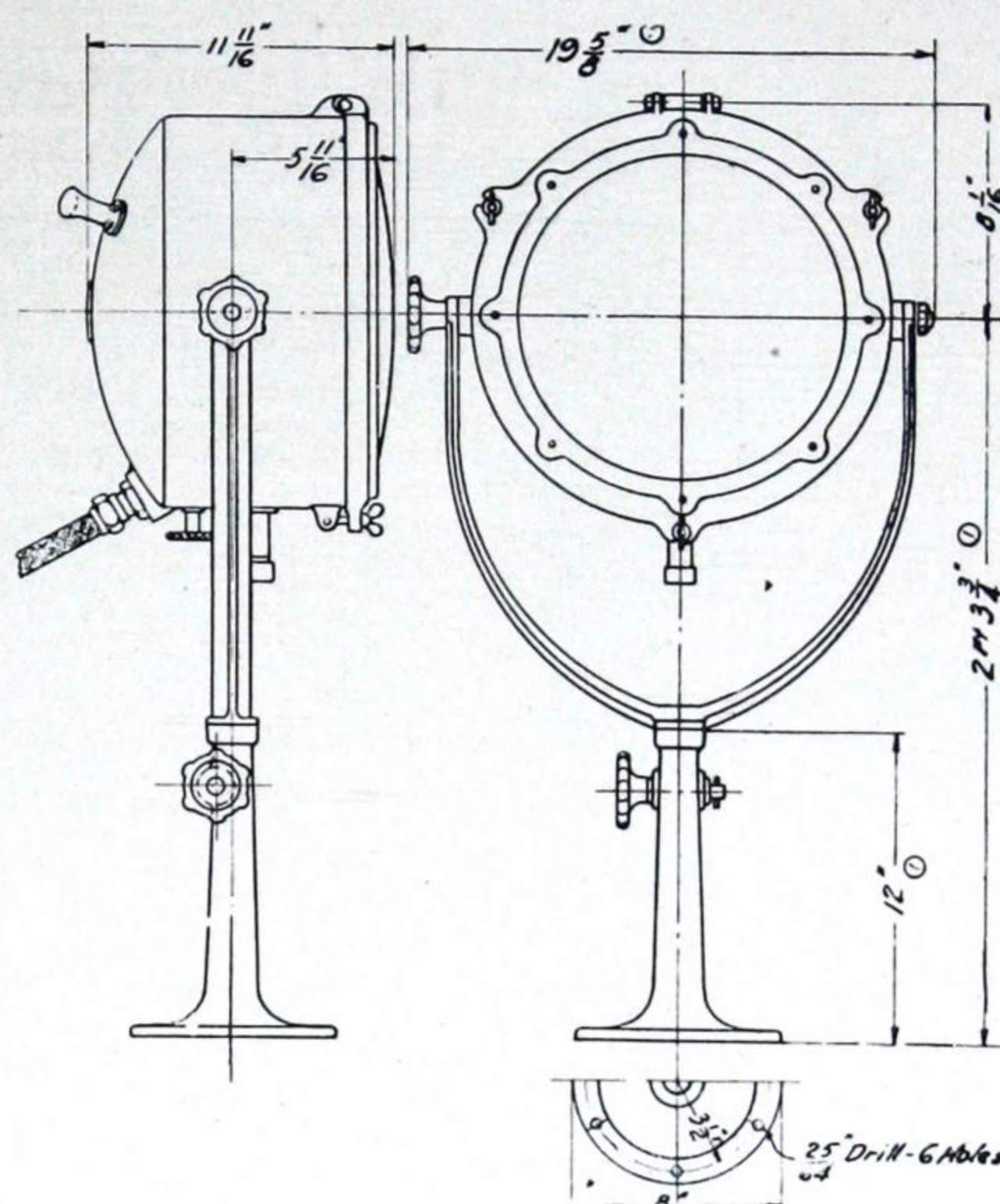


FORM J-68 PILOT HOUSE CONTROL
CAT. No. 290066

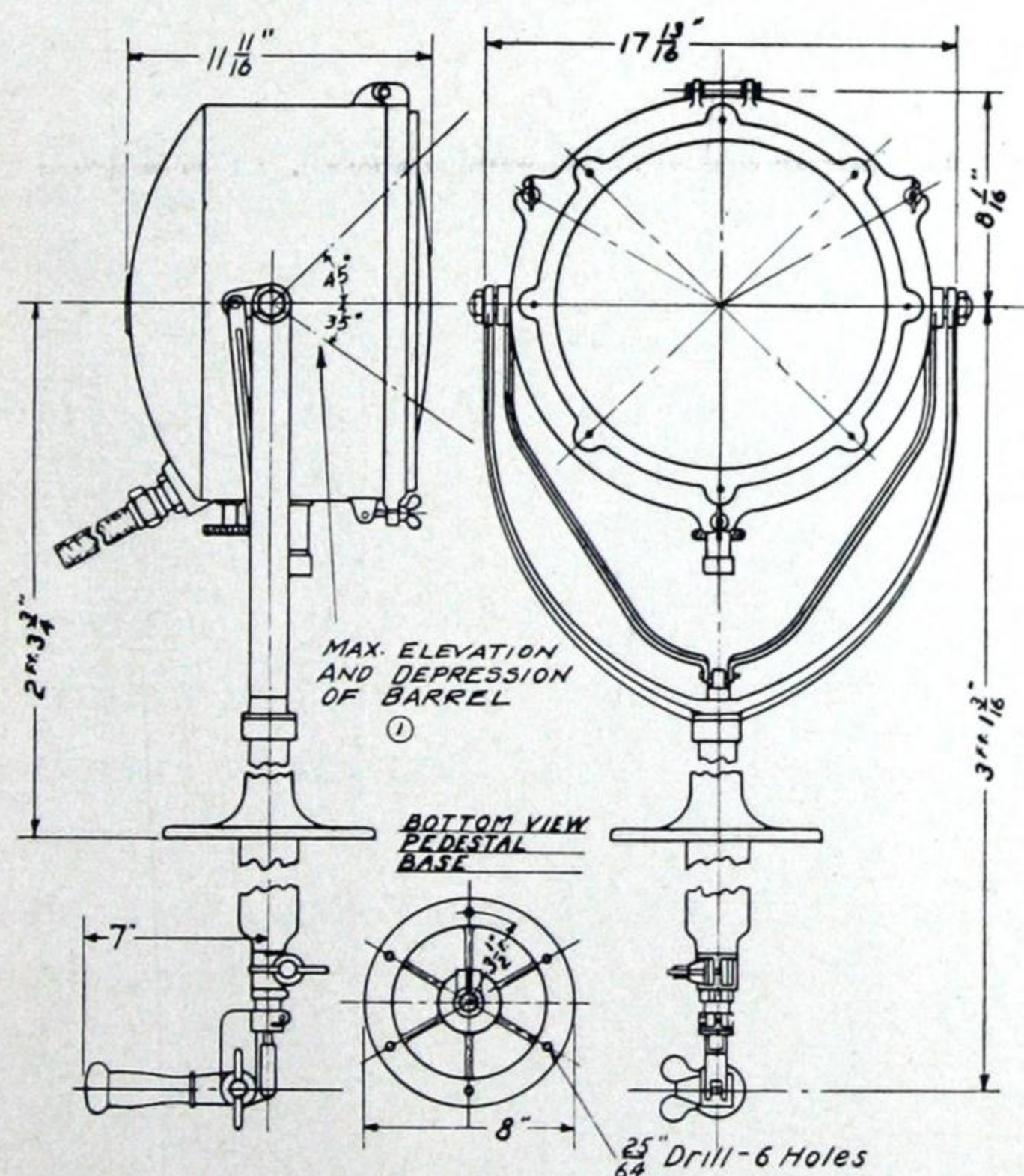
means of the lever mechanism. The maximum angles of traverse, elevation, and depression, are respectively 360, 45, and 35 degrees. Provision is made for locking the position of the unit within these limits in either the horizontal or vertical plane or both. Flexibility and ease of beam control are characteristic features of all G-E searchlights.

The J-69 incandescent searchlight is similar in design, but is controlled directly by hand. The height of the controlling handle above deck is approximately thirty-two inches. A slightly greater vertical range is available with this unit, the maximum angles of elevation and depression being respectively 90 and 55 degrees.

These units utilize a twelve-inch parabolic glass reflector which is doubly protected from mechanical injury. The outer or silvered surface is hermetically sealed by a thick coating of electrolytic copper and the entire reflector is enclosed by the metal casing of the unit.



DIMENSIONS OF J-69 INCANDESCENT SEARCHLIGHT



DIMENSIONS OF J-68 INCANDESCENT SEARCHLIGHT

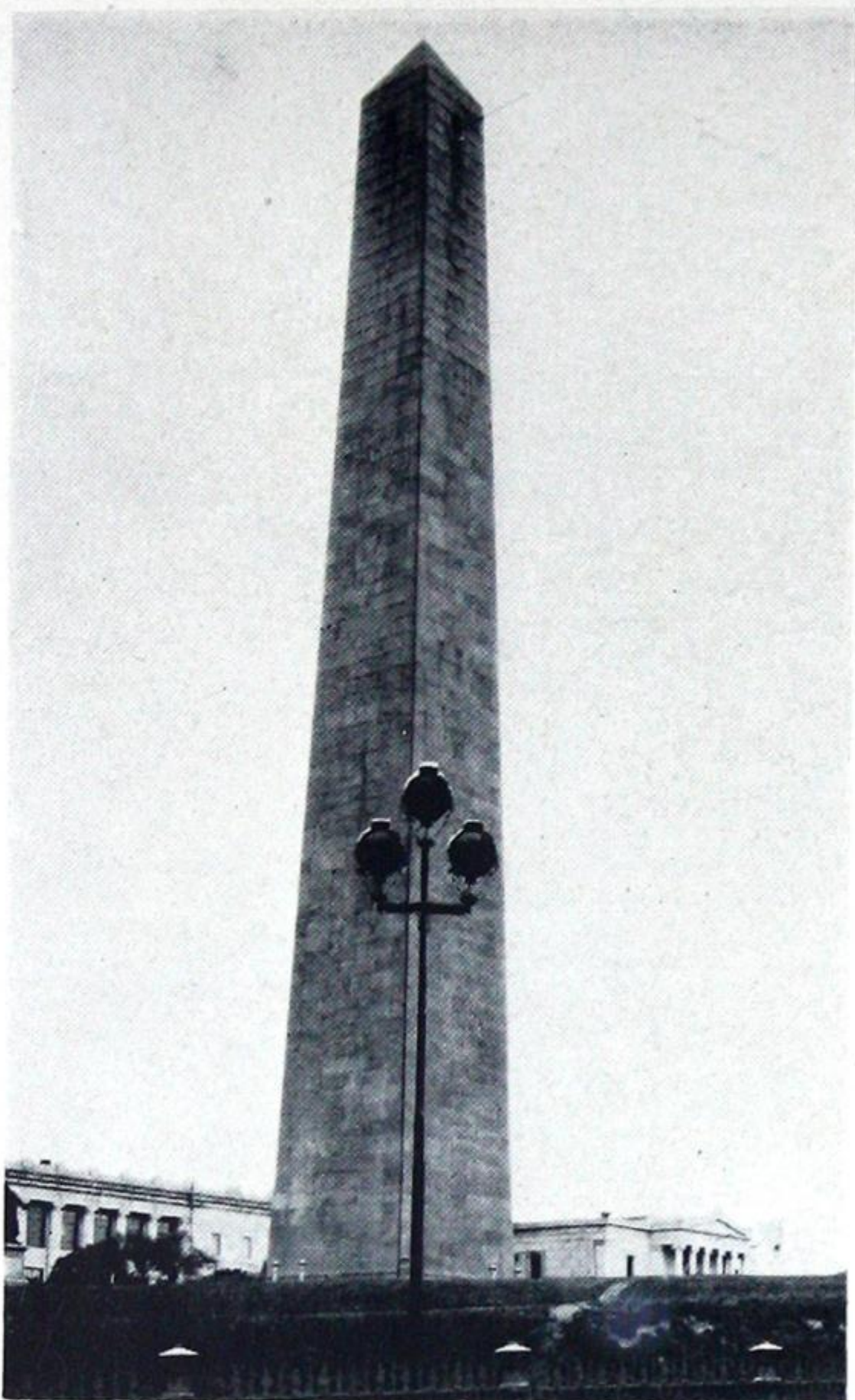
The front door is a roundel of heat-resisting glass, mounted in a cast frame. It is hinged at the top and clamped in place by three wing nuts. A weatherproof rubber gasket between the door frame and the casing excludes moisture and dust from the searchlight. The five concentric steel rings mounted inside the door cut off all stray light, so that the resultant beam is well defined.

The universal focusing mechanism is locked by a knob located on the under side of the casing.

Six feet of twin-conductor armored cable, which is sufficient for most installations, is furnished with each unit.

The J-68 and J-69 incandescent searchlights utilize a 600-watt, 30-volt, T-20 MAZDA lamp, with a Mogul screw base.

18-Inch Incandescent Searchlight



DAYLIGHT VIEW OF BUNKER HILL MONUMENT, SHOWING PROJECTOR MOUNTING

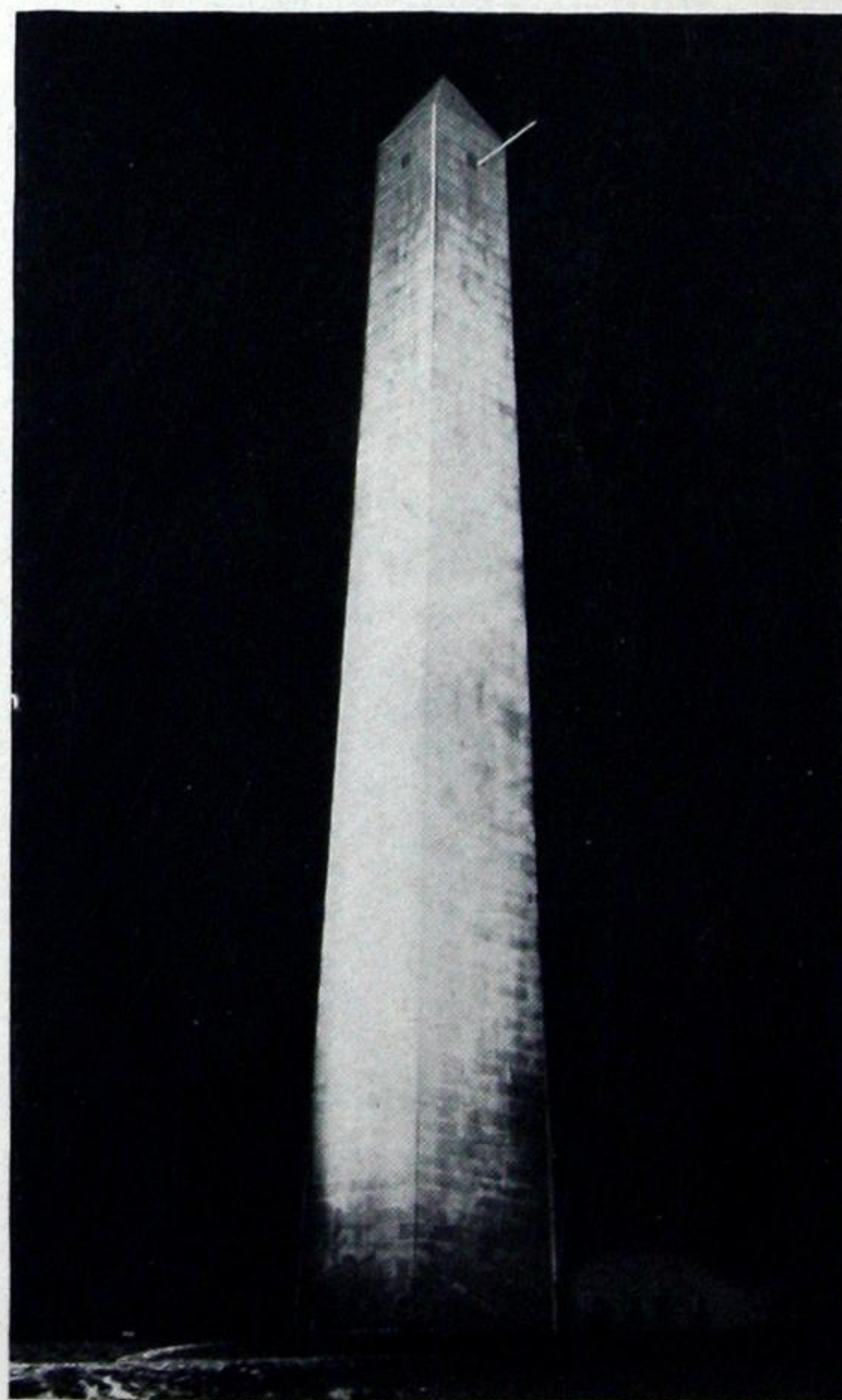
The 18-inch searchlight is a moderately priced unit. It utilizes a high-current incandescent lamp, and has a number of commercial applications including the floodlighting of construction work, monuments, and structures of like character.

One of the most notable installations of this unit has recently been made at Bunker Hill Monument, Charlestown, Massachusetts. A group of three units mounted at the top of a thirty-foot steel pole, serves to illuminate two sides of the structure. The illumination of the two remaining surfaces, is accomplished in a similar manner. In each case, the distance from the base of the monument to the projector supports, is approximately 200 feet. Especial interest attaches to this installation because of the method of light distribution employed. The photographs shown on this page, indicate the simplicity with which an admirable effect was achieved, through the selection of proper floodlighting equipment.

The 18-inch searchlight incorporates all features of G-E projectors such as: a universal focusing mechanism, three styles of mounting, an option of polished metal or hermetically sealed glass reflector, and weather-proof construction. It can be equipped with diverging glass doors, which spread the beam in a horizontal or vertical plane, to conform with the general contour of the illuminated object. A 40-degree vertical spread, prismatic lens, is used in each of the projectors at the Bunker Hill installation.

The following incandescent MAZDA lamps can be used in the 18-inch searchlight: the 1000-watt, 110/125-volt, G-40 or T-20, the 1000-watt, 32/34-volt, G-40, the 1500-watt, 32/34-volt, G-40, the 900-watt, 30-volt, T-20, and the 1200-watt, 12-volt, G-40. The last named requires a special socket. Transformers, for operating the low-voltage lamps from a 110-volt, a-c. circuit, are available.

Beam characteristics, typical of these units, are illustrated graphically on page forty-one.



NIGHT VIEW OF BUNKER HILL MONUMENT



HAND CONTROL, PEDESTAL SUPPORT
CAT. No. 248807

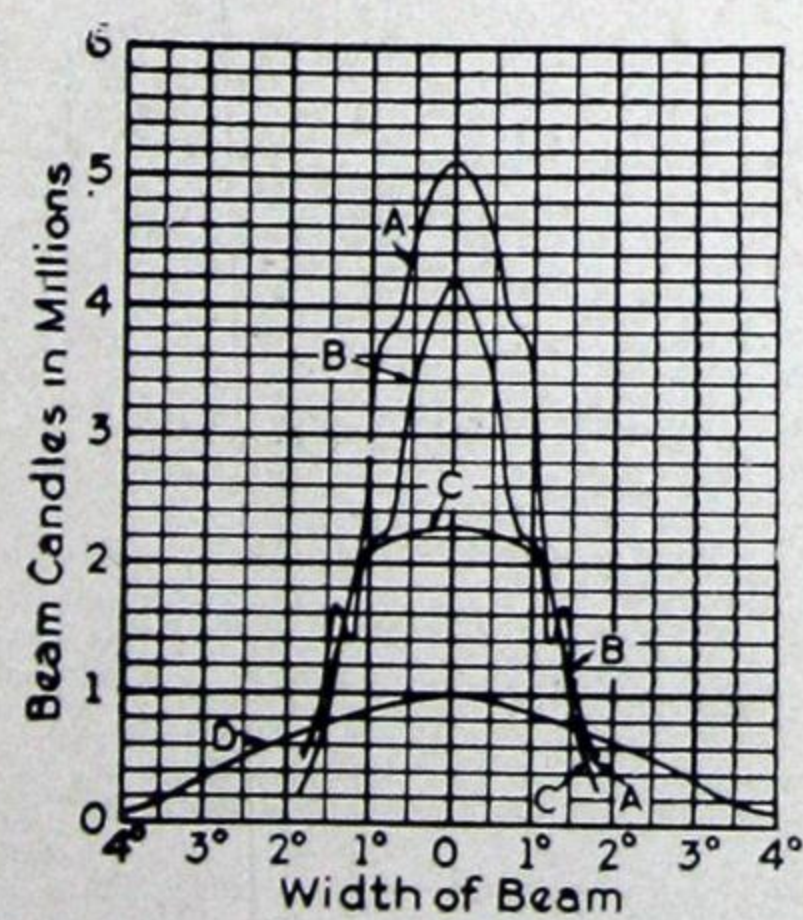
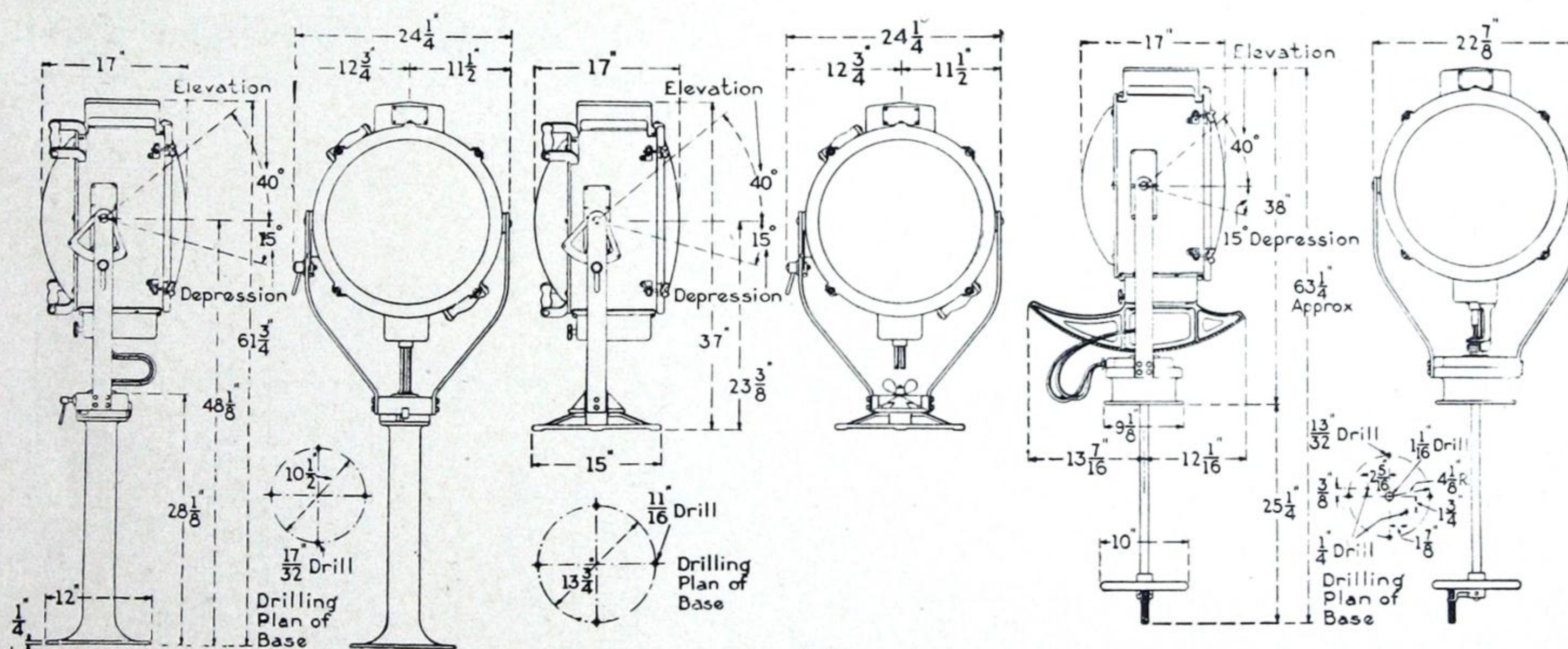


SWIVEL AND TRUNNION
FOR HAND CONTROL
CAT. No. 3049393



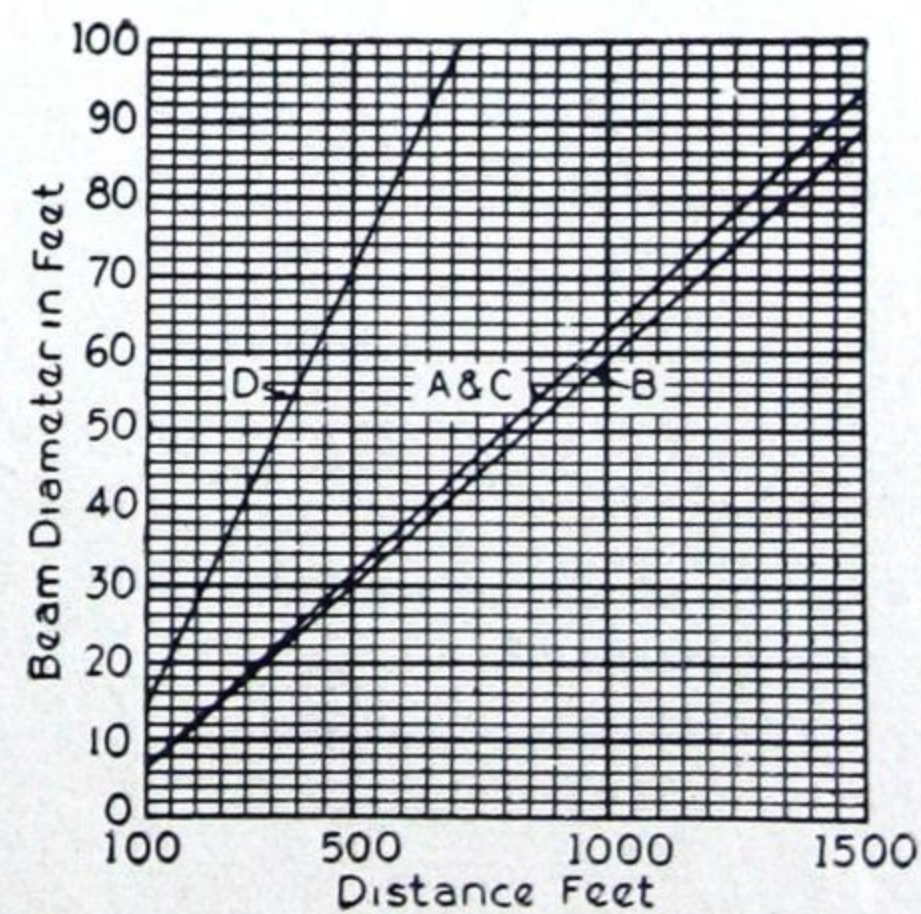
PILOT HOUSE CONTROL
CAT. No. 248809

Dimensions

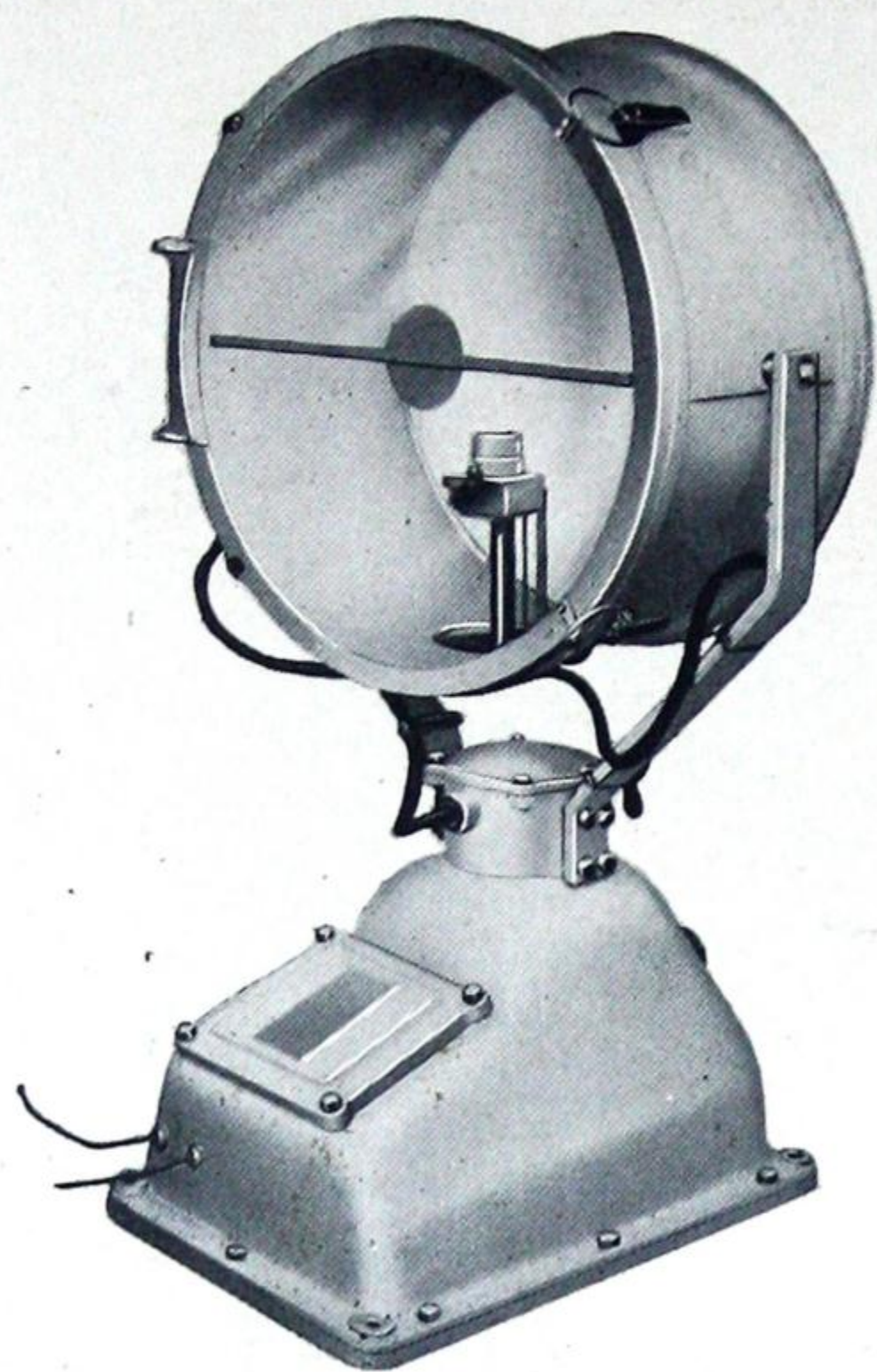


Beam Characteristics

CURVE	WATTS	VOLTS	LIFE
A	1200	12	100
B	900	30	50
C	1000	32	100
D	1500	110	800



24-Inch Aviation Beacon Continuous Rotation Searchlight



24-INCH CONTINUOUS ROTATION SEARCHLIGHT

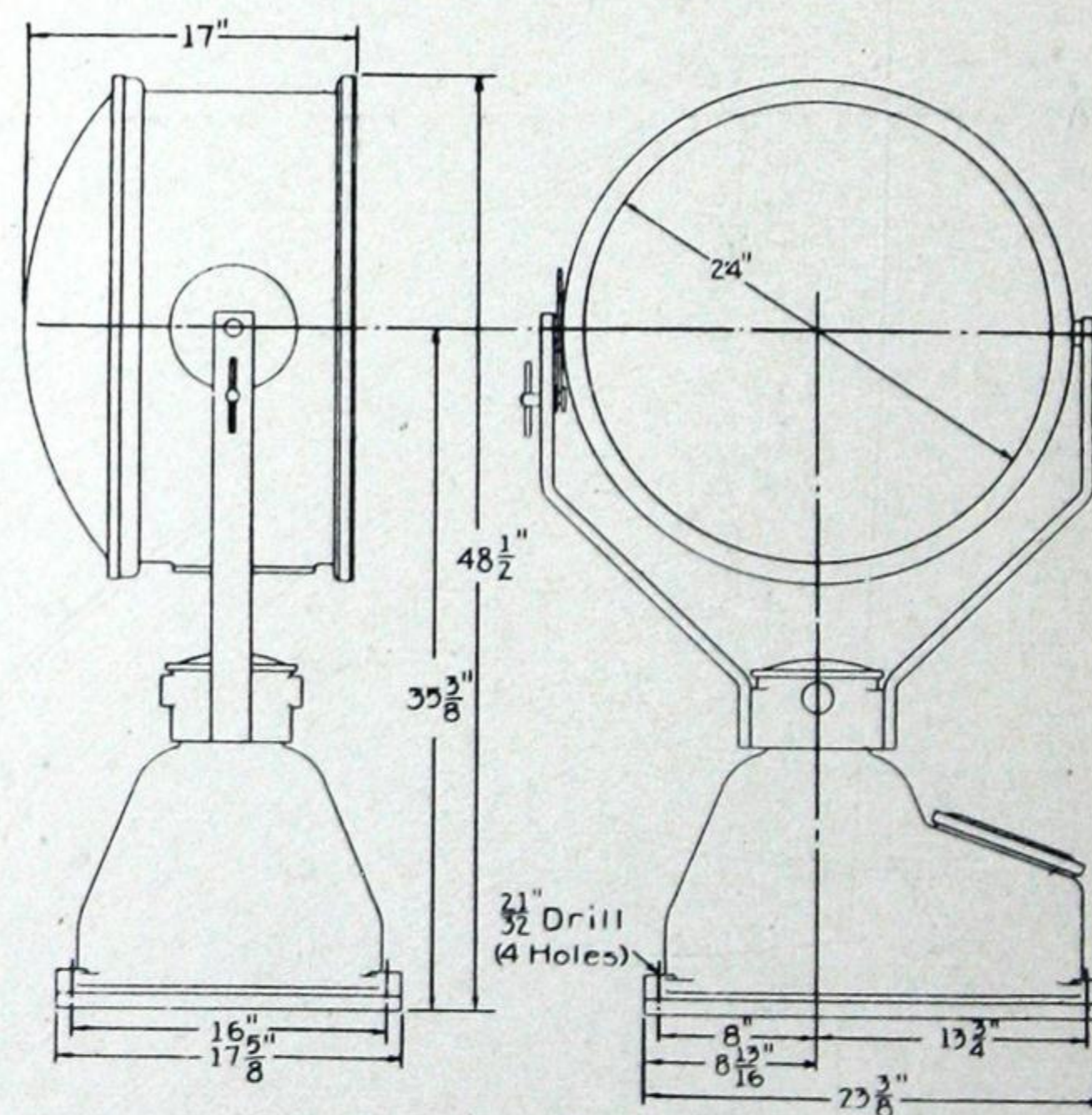
transmitting the lamp current to the slip rings. The strong, weatherproof construction of this unit is consistent with aviation requirements of dependable and positive service.

A standard, 30-volt, 30-ampere, incandescent lamp, with a monoplane filament is recommended for use with this unit. It is specified by the Air Mail Service, because of the greater efficiency of a low-voltage lamp. The standard 110-volt, 1000-watt, projection lamp can also be used where only direct current is available.

For purposes of publicity, the spectacular beam produced by a unit of this type on the roof of a prominent building is unsurpassed in brilliancy and effectiveness. It has been found that a rotating speed of one-half, or one revolution per minute, is most suitable for such installations. The rotating speed should be specified upon order.

The 24-inch revolving beacon was developed to guide the night flyers of the United States Air Mail. It turns six revolutions per minute, and is usually mounted at the top of a 60-foot steel tower, the base of which houses the generating or switching equipment. The axis of the projected beam is elevated slightly above the horizontal plane, to guide the approaching aviator by a direct flash at each revolution of the beacon.

The stationary base encloses the motor and driving mechanism, slip-rings, and friction clutch. The latter permits manual control of the beacon without stopping the driving mechanism. All moving parts are supported on ball bearings, and special self-lubricating brushes are provided for rings. The strong, weatherproof construction

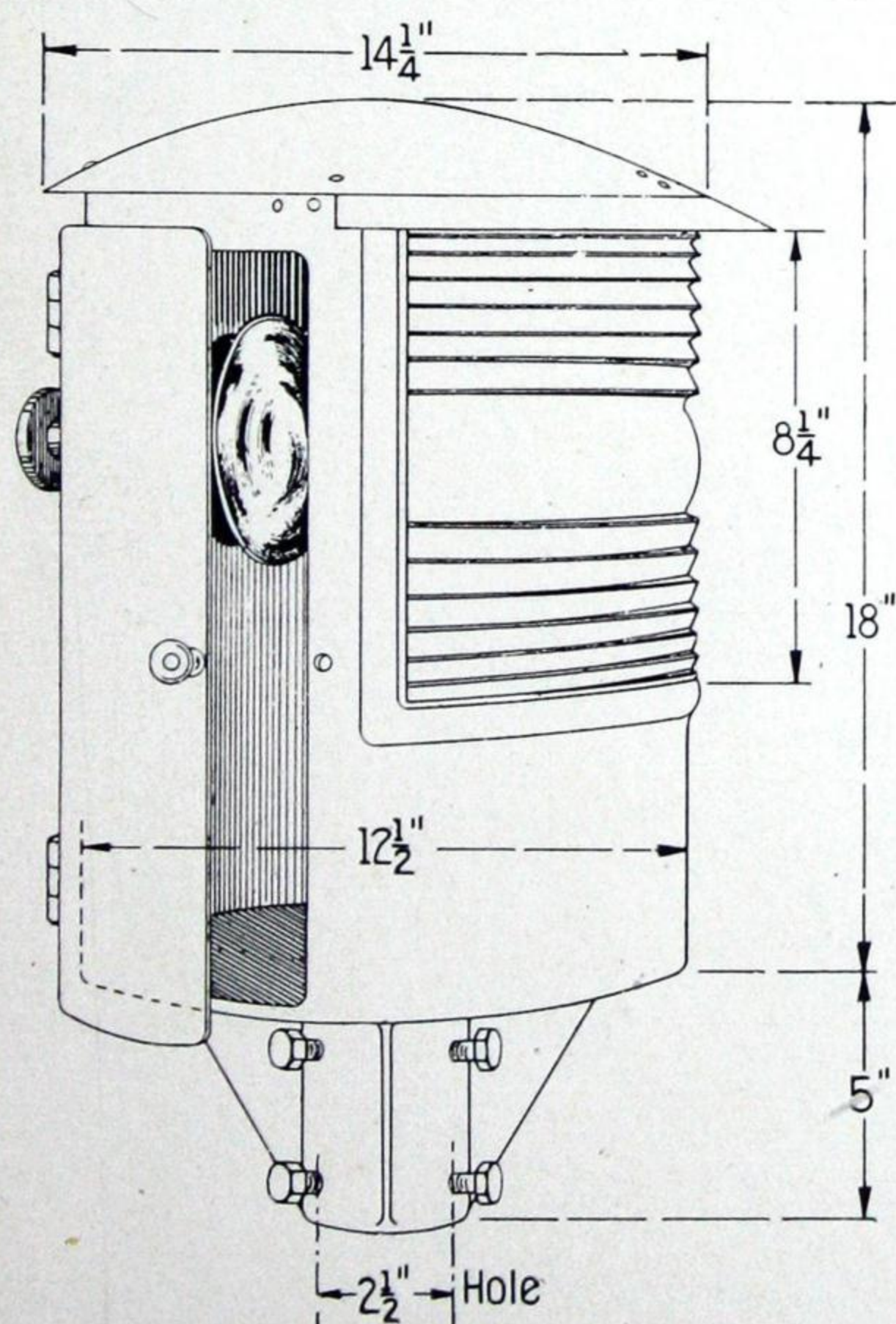


DIMENSIONS OF 24-INCH CONTINUOUS
ROTATION SEARCHLIGHT

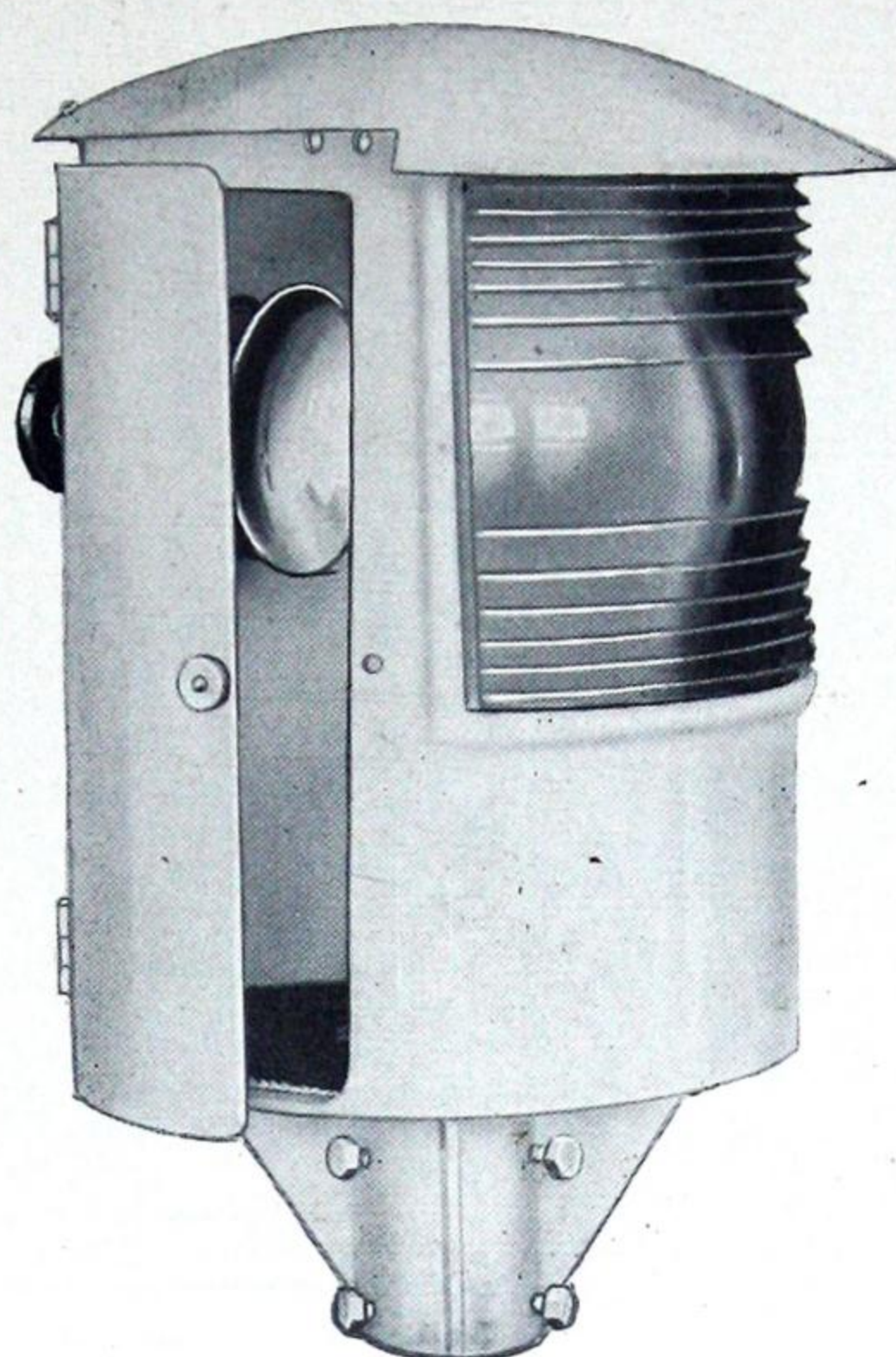
120-Degree Aviation Field Light

This unit was designed for the illumination of runways at aviation landing fields and can be adapted to any similar installation. They are placed at intervals along the boundaries of the field, and are usually connected in a series constant current circuit. A 900-watt, 30-volt, MAZDA lamp is used, the proper voltage being supplied by a Novalux Series Transformer buried in the ground at the base of the supporting pipe.

The lamp is mounted at the focal point of a 120-degree Fresnel lens approximately eight inches high, and of six inch radius. A spherical reflector is located in rear of the lamp in order to reflect the light that would otherwise be wasted. It is adjusted by means of a knob on the outside of the casing, and can be moved to vary the spread and direction of the light beam. The lamp socket is of the pre-focused type similar to that used in a motion picture unit. When the lamp has been burned out, the lamp and socket are removed as a unit, to be replaced by one previously set at the focus of the lens. This feature greatly facilitates the maintenance of these units and insures their proper operation. The cast-aluminum casing is designed to be supported by a two-inch iron pipe and is provided with levelling screws. A hinged door in the side of the casing permits access to a control switch, which short circuits the transformer, during lamp renewal operations. Openings at the top and bottom of the casing allow the proper ventilation. The lower openings are screened to prevent the operator from coming in actual contact with live parts.



DIMENSIONS OF 120-DEGREE AVIATION
FIELD LIGHT



120-DEGREE AVIATION FIELD LIGHT

The experience acquired by General Electric engineers in the design and manufacture of lighting equipment for the Air Mail Service is available to those interested in commercial aviation. Write for Bulletin GEA-216.

Lamp Data

GENERAL ELECTRIC Floodlighting Projectors and Incandescent Searchlights are designed for use with specified incandescent MAZDA lamp equipment. Failure of glass lenses and reflectors, accompanied by general inefficiency of the units, are direct results from use of the improper lamp. The data given below should be referred to before ordering.

LAMP DATA FOR G-E INCANDESCENT PROJECTORS

Used With	Watts	Volts	Base	Bulb (Clear Glass)	Life in hours	Lumens	Light Center Length (In.)	Maxi- mum Overall Dimen- sion (In.)	Service
L-1, L-3, and L-9 Projectors	500	110, 115, 120	Mogul	G-40	800	8150	4 1/4	7 1/8	Flood lgt.
L-11 Projector	*250	110, 115, 120	Medium	G-30	800	3375	3	5 1/8	Flood lgt.
L-15 Projector	300	110, 115, 120	Mogul	PS-35	1000	5400	7	9 1/8	General
L-15 Projector	500	110, 115, 120	Mogul	PS-40	1000	9600	7	9 1/8	General
L-15 Projector	750	110, 115, 120	Mogul	PS-52	1000	15000	9 1/2	13 1/8	General
L-15 Projector	1000	110, 115, 120	Mogul	PS-52	1000	21000	9 1/2	13 1/8	General
L-20 Projector	200	110, 115, 120	Medium	PS-30	1000	3200	6	8 1/8	General
L-22 and L-24 Projectors	§1000	110, 115, 120	Mogul	PS-52	1000	21000	9 1/2	13 1/8	General
18-inch Searchlight	†900	30	Mogul	T-20	50	23580	4 3/4	9 1/8	Projection
18-inch Rev. Beacon									
120 deg. Field Light	1000	32-34	Mogul	G-40	100	25100	5 3/8	8 5/8	Projection
18-inch Searchlight									
18-inch Searchlight	1000	110-125	Mogul	G-40	100	24000	5 3/8	7 3/8	Projection
18-inch Searchlight	1000	110-125	Mogul	T-20	50	26000	4 3/4	9 1/8	Projection
24-inch Rev. Beacon									
120 deg. Field Light	‡1200	12	No. 1838	G-40	100	31200	5 1/2	10 1/4	Projection
18-inch Searchlight (special socket required)									
18-inch Searchlight	†1500	110-125	Mogul	G-40	800	18500	5 3/8	7 3/8	Flood Ltg.
24-inch Rev. Beacon									
J-68 or J-69 Searchlight (with adapter)	300	28-32	Medium	T-16	50	7140	3	5 1/2	Projection
J-68 or J-69 Searchlight	600	28-32	Mogul	T-20	50	15720	4 3/4	9 1/8	Projection

* This lamp can also be used in the L-1, L-3, and L-9 Projectors with an adapter Cat. No. GE070.

† These lamps utilize a monoplane filament.

‡ The overall dimensions include the 1 1/2 inch prongs on base.

§ This lamp is recommended for these units, however, the 300, 500 and 750 watt standard lamps listed with the L-15, can also be used.

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